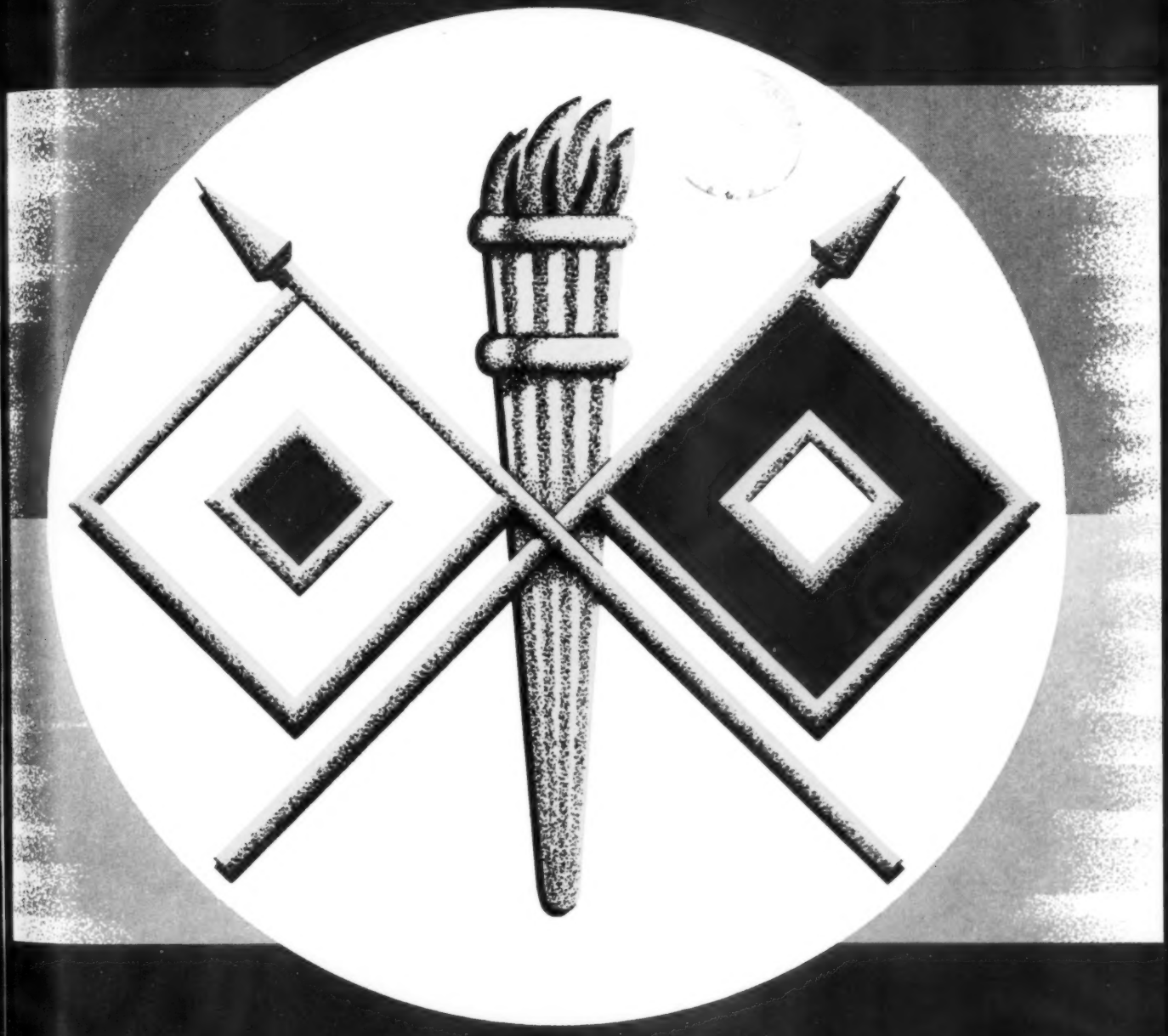
TELEPHONY



SPECIAL U. S. ARMY SIGNAL CORPS ISSUE

DECEMBER 11, 1943

OUR SECOND "HITCH" WITH THE SIGNAL CORPS

This is the second war during which it has been our privilege to work with the U. S. Army Signal Corps in the production of vital communications equipment. Stromberg-Carlson feels a pardonable pride in being associated with this branch of the service which plays such an indispensable part in modern military science.

Special U. S. Army Signal Corps Issue

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TELEPHONY

The Journal of the Telephone Industry

DECEMBER 11, 1943

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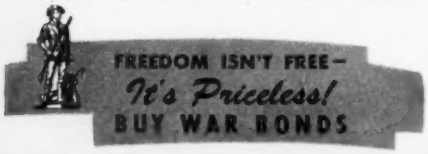

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LINE UP WITH *Kellogg* FOR LINE SUPPLIES

Foreword

FOR THE second time TELEPHONY dedicates an issue to the United States Army Signal Corps. A year ago we devoted our November 28 number to the history of this branch of the American armed forces, believing it was destined to play a more important part in this war—because of its wide-spread, global scope—than in any of the five major wars in which our country has been engaged.

Events in 1943 have fully justified this belief. A year ago we spoke of the Signal Corps history; *today we praise its achievements.* Since American forces entered Africa 13 months ago the Signal Corps has grown to huge proportions, and its vital contribution to waging and winning the war has increased in importance. Military secrecy prevents an exact report of the number of men now in the Corps, but it may be stated that its strength today far exceeds all past records. In fact, its present enrollment far exceeds the most extensive plans even imagined less than two years ago. This naturally has followed the tremendous expansion of all other branches of the armed services.

The past year has seen the men of the Signal Corps in the thick of activities in all the combat zones. Wherever the Army, the Navy or the Air Force went, members of the Corps were present running communication lines which meant so much to the combined effort. As this war has developed, more and more emphasis has attached to the vital necessity of adequate and efficient communications. Commanders in every theater of the war testify to the faithful service furnished by the Signal Corps, whose work makes possible the successes won in all phases of the conflict. So swift is the tempo of modern war that instant coordination of all branches of the service is imperative. That's where the communication soldiers—for that is what they are—come in, and that's where the Signal Corps is doing a supreme job.

Some day it will be possible to report figures showing the vast amount of equipment furnished by manufacturers producing the tools needed by the Signal Corps. These figures already run into the billions, for the wastage in war is tremendous, and the Signal Corps is operating everywhere — the Southwest Pacific, Alaska, Iceland, Africa, Europe, China and wherever the flag flies. According to latest published reports the Signal Corps has contracted for $3,000,000,000 worth of equipment in 1943 and the 1944 total will be even greater.

Telephone manufacturers are a big factor in this sphere of the war and today are producing better communication equipment—and infinitely more—than the world has ever known, for no great victory has been achieved in World War II that telephone science has not helped to win.

No doubt, many of the wartime developments of telephone manufacturers will prove useful in the future operations of communication systems when the days of peace return. And incidentally, the telephone industry also has furnished a large number of men now serving with the Signal Corps.

A significant phrase in nearly every war communique reads: "Heavy damage was done to enemy communications," which testifies to the essentiality of this branch of the service. Our steady progress toward victory proves that the United States Army Signal Corps is successfully doing its part in winning the war. So—

A 1943 SALUTE TO THE SIGNAL CORPS!

Maj. Gen. Harry C. Ingles

Chief Signal Officer, U. S. Army

HARRY CLYDE INGLES was born in Pleasant Hill, Neb., on March 12, 1888. Following graduation from the United States Military Academy he was appointed a second lieutenant of Infantry on June 12, 1914. He was promoted to first lieutenant on July 1, 1916; to captain on May 15, 1917; to major (temporary) on October 20 of the same year. He reverted to his permanent rank of captain on September 12, 1919, and was promoted to major on July 1, 1920; to lieutenant colonel on August 1, 1935; to brigadier general (temporary) on April 25, 1941; to major general (temporary) on December 2, 1942.

He served first with the 14th Infantry at Fort Lawton, Wash., until May, 1916, then accompanied this regiment to Douglas, Ariz., for border patrol duty until September of the same year, when he went to Yuma, Ariz., until the following April. He then joined the 2nd Telegraph Battalion of the Signal Corps at El Paso, Tex., until July, 1917, when he was assigned as an instructor at the Signal Officers' Training Camp, Leon Springs, Tex., until September, 1918. He then went to the Signal Officers' Training Camp at Camp Meade, Md., as an instructor, and assumed command of the 22nd Field Signal Battalion at that post between December, 1918, and January, 1919.

In January, 1919, he went to Camp Normoyle, Tex., in command of a motor transport repair unit until August of that year, when he enrolled in the Army Signal School, Fort Leavenworth, Kan. He was graduated on June 15, 1920, and after a brief period at Camp Vail, N. J., followed by a month at Fort Benning, Ga., as an instructor at the Infantry school he was assigned to duty with the organized reserves at the University of Minnesota from October, 1920, until August, 1921. For the next two years he was Signal Officer of the Philippine Division.

General Ingles was director of the Signal School at Fort Monmouth, N. J., from January, 1924, until June, 1926, when he enrolled in the Command and General Staff School, Fort Leavenworth, Kan., completing the courses as a distinguished graduate in July, 1927. He then was assigned as an instructor in the Command and General Staff School until August, 1931, when he enrolled in the Army War College, Washington, D. C. After graduation in June, 1932, he was assigned as director of the Department of Applied Communication and as instructor at the Signal School at Fort Monmouth. He assumed command of the 51st Signal Battalion at that post in July, 1933.

In September, 1935 he was assigned to the operations and training division of the War Department General Staff, Washington, D. C. He was appointed a member of the Signal Corps board and inspector of training and transportation of tactical organizations, with headquarters at Fort Monmouth and Camp Beauregard, La., in August, 1939. He was assigned to headquarters of the Third Army at Fort Sam Houston, San Antonio, Tex., in November, 1940, and the following May was ordered to the Caribbean Defense Command, Quarry Heights, Panama Canal Zone, as Signal Officer. In March 1942, he was named Chief of Staff of the Caribbean Defense Command.

He became Deputy Commander, United States Forces in the European Theater of Operations, in February of this year. Upon his return to the United States in May, he was assigned to duty at headquarters, Army Service Forces, Washington, D. C., as director of operations. The following month he was named Acting Chief Signal Officer, Office of the Chief Signal Officer, and on July 1 of this year he was named Chief Signal Officer of the Army.

Maj. Gen. James A. Code, Jr.

Assistant Chief Signal Officer

BORN in San Francisco, Calif., January 17, 1893, and following graduation from the United States Military Academy he was appointed a second lieutenant, 1st Coast Artillery Corps, April 20, 1917.

He was promoted to first lieutenant May 15, 1917; to captain (temporary) August 5 of the same year; and to major (temporary) October 10, 1918. He reverted to his permanent rank of captain, June 30, 1920; and was promoted to major, November 1, 1932; to lieutenant colonel, July 1, 1940; to colonel (temporary) December 11, 1941; to brigadier general (temporary), January 31, 1942; to major general (temporary), December 3, 1942.

He first served at Fort Winfield Scott, San Francisco, until July, 1917, moving to Boise Barracks, Ida., as examining officer for candidates at training camp at the Presidio of San Francisco, until the following August. He then became aide to Brig. Gen. R. P. Davis at Camp Pike, Ark., for the remainder of that year. He was on duty at the School of Fire, Fort Sill, Okla., until March, 1918, then moved to New Orleans for one month, and Little Rock, Ark., inspecting the National Guard of Arkansas until May of that year. He was ordered to Jackson Barracks, La., until October of the same year, and to Camp Eustis, Va., with the 36th Coast Artillery until November, when he joined the 34th Coast Artillery Company at that post.

He was ordered to Fort Barrancas, Pensacola, Fla., until October, 1919, when he was transferred to Camp Zachary Taylor, Louisville, Ky., between June and August, 1920. He served at Camp Alfred Vail, N. J., then entered Yale, graduating in June, 1921, when he returned to complete his assignment at Camp Alfred Vail. He was professor of Military Science and Tactics at Ohio State University between September, 1921, and June, 1924. During this tour he was transferred to the Signal Corps September 12, 1923. He again returned to Camp Alfred Vail in October, 1924, and in March of the following year sailed for the Philippine Islands for duty at Fort Santiago, Manila.

Upon his return to the U. S. in December, 1926, he was assigned to the Presidio of San Francisco, until February, 1927. In October, 1928 he moved to Fort Mason, Calif., as contracting officer of the Signal Section in the San Francisco General Depot until January, 1931, when he was transferred to headquarters of the Second Corps Area, Governors Island, N. Y., serving as Acting Corps Area Signal Corps Officer and as Assistant Executive Officer, successively.

He began a tour of duty as professor of Military Science and Tactics at University of California, in September, 1934. In July, 1938 he became Signal Officer for the Atlantic Sector at Fort De Lesseps, Panama Canal Zone. He became Signal Supply Officer at Fort William D. Davis, Panama Canal Zone, in March, 1940, and returned to the U. S. the following July. He then began service as Signal Officer of the 2nd Division at Fort Sam Houston, Tex., moving to Brownwood, Tex., as Signal Officer of the VIII Army Corps in May, 1941. In August of that year he was assigned to duty in the Office of the Chief Signal Officer, Washington, D. C., as chief of the Control Division. In July, 1942, he became Assistant Chief Signal Officer.

Brig. Gen. Frank C. Meade

Director, Plans and Operations Division

BORN in Philadelphia, Pa., December 16, 1896. He was graduated from the United States Military Academy, August 30, 1917, when he was commissioned second lieutenant, Coast Artillery Corps.

On the same date he was promoted to first lieutenant; to captain (temporary), March 12, 1918, and on September 30, 1919, he resigned his commission in the Army. He was again commissioned first lieutenant, Coast Artillery Corps, July 26, 1921. On July 3, 1928, he was transferred to the Signal Corps; was promoted to captain, August 1, 1935; to major, July 1, 1940; to lieutenant colonel (temporary), September 15, 1941; to colonel (temporary), February 1, 1942, and to brigadier general (temporary) on December 4 of the same year.

He was first assigned to Fort Totten, N. Y., October 8, 1917, where he remained until May 1, 1918, and was then transferred to Fort Monroe, Va., for two months. In July he returned to Fort Totten and in August, 1918, was assigned to the United States Military Academy as an instructor until March, 1919, when he was sent to Fort Morgan, Ala. On September 30, 1919, he resigned his commission. He was reappointed first lieutenant, Coast Artillery Corps, in July, 1921, and was assigned to the Coast Defenses of Boston, Fort Strong, Mass. In September, 1922, he was transferred to Fort Banks, Mass.

In March, 1923, he was ordered to Fort Kamehameha, Hawaii, with the 55th Artillery. He remained there until August, 1924, at which time he was sent to Fort Shafter, Hawaii, as an instructor in the District Communication School, Hawaiian Coast Artillery District. He returned to Fort Kamehameha in January, 1925, where he served until he was ordered to Fort Shafter in May of that year.

He returned to the U. S. and in March, 1926, was assigned to the 8th Coast Artillery at Fort Preble, Me. In September of that year he proceeded to Fort Monmouth, N. J., for Post and Staff duties. He completed the Signal Corps school there in June, 1928. He then transferred to the Signal Corps, remaining at Fort Monmouth.

In March, 1928, he was assigned to the University of Wisconsin as a professor of Military Science and Tactics. In August, 1932, he entered Yale, in the communication engineering course. In June, 1933, he served at Fort Monmouth and Camp Dix, N. J., and in September of that year returned to Fort Monmouth as Post Adjutant. He was appointed an instructor in the Signal Corps School there in August, 1934. He was graduated from the Command and General Staff School, Fort Leavenworth, Kan., in June, 1938, and was assigned to the War Plans and Training Division, Office, Chief Signal Officer, Signal Corps, Washington, D. C. He was appointed Officer in Charge, Air Communications Division, in January, 1942.

He served as Commanding Officer of the Signal Corps Replacement Training Center, Camp Crowder, Mo., in December, 1942, and in January, 1943, he was again assigned to duty in the Office of the Chief Signal Officer, Washington, D. C. In August of this year he was made director, Plans and Operations Division, Office, Chief Signal Officer.

Maj. Gen. Roger B. Colton

Chief, Engineering and Technical Service

Born in Jonesborough, N. C., December 15, 1887. Graduated from Yale in 1908 with degree of Bachelor of Philosophy. Accepted a commission in the Regular Army as second lieutenant, Coast Artillery Corps, November 8, 1910.

Promoted to first lieutenant, July 1, 1916; to captain, May 15, 1917; to major (temporary), June 28, 1918; to lieutenant colonel (temporary), September 19, 1918. Reverted to his permanent rank of captain, February 2, 1920, and promoted to major, July 1, 1920; to lieutenant colonel, August 1, 1925; to colonel, November 1, 1939; to brigadier general (temporary), January 30, 1942; and to major general, September 7 of that year.

He served with the Coast Artillery in the Continental United States and Philippines from 1910 to 1930. He was also at one time assigned to the Cable Steamer Joseph Henry in eastern waters. In August, 1919, he enrolled in a special course in electrical engineering and gas engines at Massachusetts Institute of Technology and earned a degree of Master of Science in December, 1920. He also entered Columbia University, New York City, for special studies in January, 1921, completing them in June of that year. He completed the course at the Command and General Staff School, Ft. Leavenworth, Kans., and transferred to the Signal Corps on June 21, 1930.

Two months later he became Signal Officer, Panama Canal Zone. He was placed in charge of the Plant and Traffic Division in the Office of the Chief Signal Officer in Washington, D. C., in August, 1932, and of the Research and Development Division of that office two years later. He was executive officer at Ft. Monmouth, N. J., and the Signal Corps Laboratories between August, 1936, and August, 1937. He then enrolled in the Army War College, from which he was graduated in June, 1938. He again became director of the Signal Corps Laboratories and in February, 1942, he was ordered to duty in the Office of the Chief Signal Officer in Washington, D. C. In August, 1943, he became chief of the Engineering and Technical Service of the Chief Signal Office.

Maj. Gen. Wm. H. Harrison

Chief, Procurement and Distribution Service

Born in Brooklyn, N. Y., June 11, 1892. From 1909 until 1914 he was a repairman and wireman for the New York Telephone Co., attending Pratt Institute from 1913 to 1915. In 1914 he went into the engineering department of Western Electric Co. in New York City and in 1918, accepted a position with the American Telephone & Telegraph Co.

He served successively as engineer, as equipment and building engineer, and as plant engineer with A.T.&T. and in 1933 became vice president and director of the Bell Telephone Co. of Pennsylvania and of the Diamond State Telephone Co.

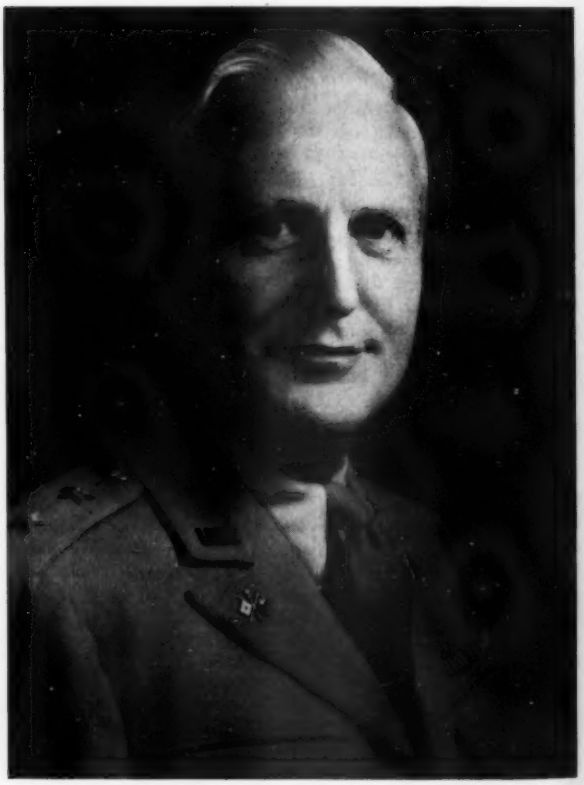
In 1937 he was named assistant vice president of A.T.&T. and in 1938 became vice president and engineer of that company, serving in that position until he entered service with the Army in 1942.

In 1938 he received the degree of Doctor of Engineering (honorary) from Polytechnic Institute of Brooklyn and in 1939 received the degree of Doctor of Laws (honorary) from Notre Dame. He served as director of the Construction Division of the National Defense Council in 1940 and in 1941 became chief of the Shipbuilding, Construction and Supplies Branch of OPM. In 1942 he became director of the Production Division of WPB.

He subsequently became a director of the 195 Broadway Corp., Bell Laboratories and the Bell Telephone Co. of Canada and a member of the Board of the Polytechnic Institute. He is a past president of AIEE and member of the N. Y. Electrical Society, the Newcomen Society, Eta Kappa Nu, and Tau Beta Pi.

He was commissioned colonel (temporary) in the Army, June 16, 1942, and called to active duty three days later. He was assigned to the Procurement and Distribution Division, Headquarters Services of Supply, Washington, D. C. On June 27, 1942, he was promoted to brigadier general (temporary).

He was named Director of Procurement, Office of the Assistant Chief of Staff for Materiel, Headquarters Services of Supply (now Army Service Forces) in July, 1942, and in July, 1943, he was assigned to the Office of the Chief Signal Officer. He was promoted to major general (temporary) on June 24, 1943. In August of this year he was named chief, Procurement and Distribution Service, Office of Chief Signal Officer.



Brig. Gen. Frank E. Stoner

Chief, Army Communications Service

Born in Vancouver, Wash., December 25, 1894. Attended United States Military Academy between August, 1916, and January, 1917. In the latter month he enlisted as a private in the Regular Army and served in 37th Infantry and as a sergeant in Quartermaster Corps until July, 1917, when he was commissioned a second lieutenant in the Philippine Scouts. He was promoted to first lieutenant in the Scouts in April, 1918. He was commissioned first lieutenant of Infantry, Regular Army, July, 1920, and promoted to captain on the same date. Promoted to major in August, 1935; to lieutenant colonel, July, 1940; to colonel, December, 1941, and to brigadier general (temporary), February, 1942.

In December, 1921, he became a professor of Military Science and Tactics for the Dallas (Tex.) High School and was detailed to the Signal Corps, September, 1923. He was appointed assistant to the Signal Officer in Headquarters, 8th Corps Area, in February, 1925.

He was transferred to Signal Corps, July, 1926, and enrolled in the Signal School, Ft. Monmouth, from which he graduated in June, 1928. He was then placed in charge of the War Department Message Center, Washington, D. C., from 1928 until July, 1932, when he was transferred to Seattle, Wash., for duty with the Washington-Alaska Military Cable and Telegraph System.

After graduating from the Command and General Staff School, Ft. Leavenworth, Kan., in June, 1937, he became Post Executive Officer at Ft. Monmouth.

After graduation from the Army Industrial College, Washington, D. C., in June, 1940, he was appointed Signal Officer of the V Army Corps. On September 23 of the same year he was assigned to headquarters, 3rd Army, San Antonio, Tex., and on December 26, 1941, was assigned to Signal Corps Replacement Training Center, Ft. Monmouth. On February 20, 1942, he was ordered to Washington, D. C., for duty in the Office of the Chief Signal Officer. In August of this year he was made chief, Army Communications Service, Office of the Chief Signal Officer.

Brig. Gen. Jerry V. Matejka

Chief, Personnel and Training Service

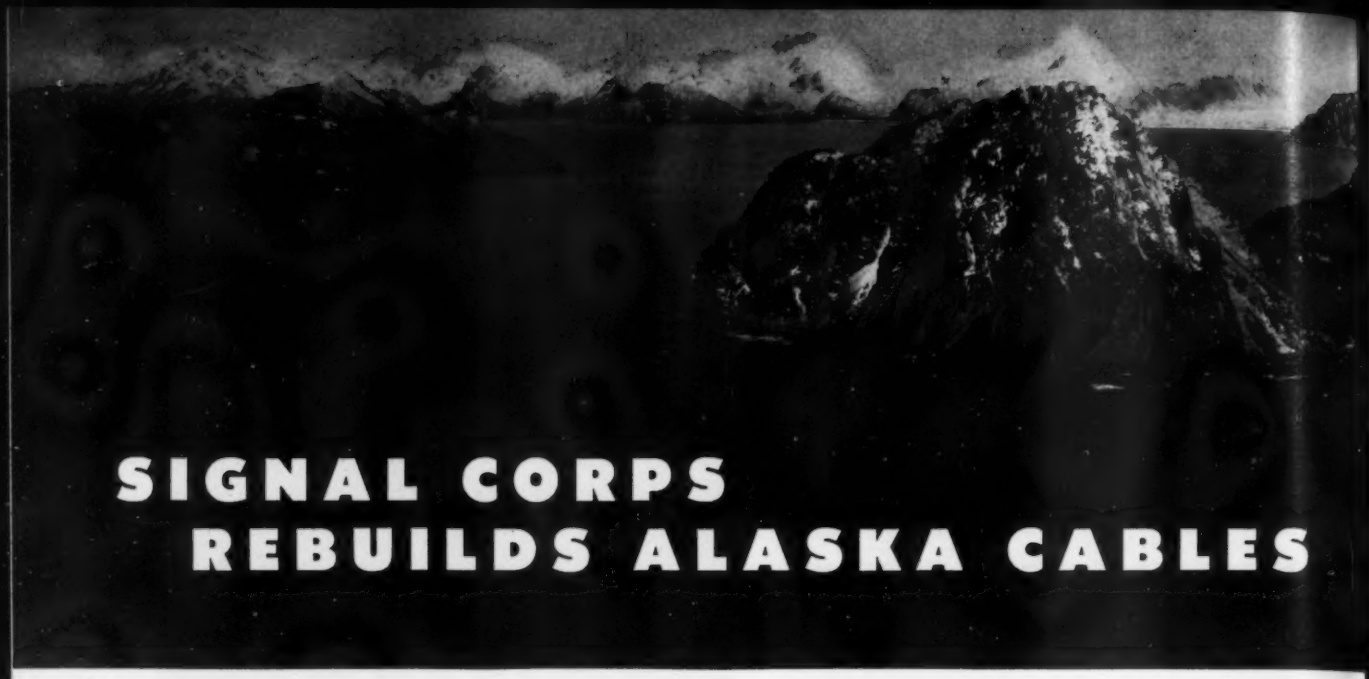
Born at Nelsonville, Tex., August 18, 1894. Graduated from University of Texas in 1916 with degree of Bachelor of Science in electrical engineering, and was commissioned second lieutenant in the Engineer Corps Reserve, July 10, 1917.

Commissioned second lieutenant in the Coast Artillery Corps, Regular Army, October 26, 1917, and promoted to first lieutenant (temporary), January 4, 1918; to captain (temporary), October 10, 1918; to first lieutenant (permanent), June 24, 1919; to captain, July 1, 1920; to major, August 1, 1935; to lieutenant colonel, August 18, 1940; to colonel (temporary), December 24, 1941; to brigadier general (temporary), August 2, 1942.

He attended the Engineer Officers Training Camp at Leon Springs, Tex., in 1917 and then went to Fort Leavenworth, Kan., for further training. Served at Fort Monroe, Va., and Jackson Barracks, La., with Coast Artillery Corps, and in January, 1919, was assigned to Panama Canal Department and became assistant to Signal Officer in June, 1920. Returned to U. S. in 1921 and in September of that year he became Assistant Signal Officer of the 8th Corps Area, Fort Sam Houston, Tex. On November 10, 1923, he transferred from the Coast Artillery Corps to the Signal Corps.

He was ordered to Washington, D. C., in June, 1924, for duty in the Office of the Chief Signal Officer. In February, 1926, he entered the Army Industrial College, from which he was graduated in the same year, and was assigned to the Office of the Assistant Secretary of War for procurement work. He enrolled in the Signal Corps School at Fort Monmouth, N. J., in September, 1929, and, upon graduation in April, 1930, remained as an instructor.

Graduated from the Command and General Staff School at Fort Leavenworth in June, 1934. Graduated from the Army War College in Washington, D. C., in June, 1935, and returned to the Office of the Assistant Secretary of War. In August, 1940, he was assigned to general headquarters of the Army in Washington, D. C. He was assigned to the Army Group in January, 1942, and in August, 1942, was assigned to an unannounced overseas station. In July, 1943, he returned to the U. S. for duty in the Office of the Chief Signal Officer as chief of Personnel and Training Service.



SIGNAL CORPS REBUILDS ALASKA CABLES

By Maj. W. V. Sayner

Prepared Under Direction of
Col. Fred P. Andrews
Officer in Charge
Alaska Communications System

"ABANDONED IN PLACE" only a few years ago, the ocean telegraph cable network of the Signal Corps' Alaska Communication System has been completely rehabilitated, modernized and enlarged and is handling an impressive volume of military traffic. Unable in the years of peace to compete with radio in cost and flexibility, the telegraph cables of the old WAMCATS (Washington and Alaska Military Cable and Telegraph System) had fallen into disuse in the early thirties. However, through the far-sightedness of successive officers in charge of the system, the terminal installations and experienced personnel were retained.

Even before Pearl Harbor the secrecy and reliability afforded by cable telegraph was recognized as invaluable in the defense of Alaska. A cableship was chartered to repair the cables. The delicate terminal and testing equipment, consisting of such precision instruments as reflecting galvanometers and siphon recorders which respond to feeble currents in the unbelievably low order of one ten-thousandth of a microampere, were dusted off and reconditioned. Old operators were reassigned to cable positions, new ones placed in training.

By December 1, 1941, over 1,600 miles of cable had been made serviceable by repair or replacement of 19 breaks. Six months later the entire old network was in service. Subsequently many important additions were laid under Signal Corps supervision.

Besides this rehabilitation program, the defense program called for construction of an extensive system of submarine telephone cables in harbors and coastal waters. The sum total of these operations has required continuous use of one cableship for over two years, and two others for the equivalent of another year.

Alaska cable operations are performed under unusually severe conditions of weather and geography. In summer the waters are calm enough, but there are fogs that sailors fear no less than flyers. At other seasons the fogs clear somewhat but winds churn the ocean so that seldom can cable be comfortably laid, and often severe storms force ships to flee to port. The long summer sun is hardly a good offset to the long arctic nights of winter. The approaches to practically all harbors are studded with numerous small islands, reefs, and under-water pinnacles.

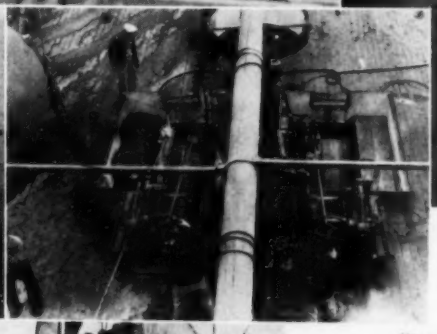
The very nature of the cable network often requires landings among them. Ship anchorages and other havens must usually be avoided by the cable route to minimize pos-

COL. FRED P. ANDREWS

RIGHT: Up and over goes shore-end of telegraph cable as barge is towed from cableship toward shore. Naval escorts are in background guarding against enemy submarines and airplanes.

BELOW: Shore-end cable is loaded on barge.

BELOW: Floating cable with empty barrels is another method of landing shore-end cable.



ABOVE: Cable is carried in huge "tanks" aboard cableship. Formerly these tanks were flooded with water to preserve the gutta percha insulation.

LEFT: Fifty thousand pounds line pull can be handled by cableship cable machine. Except for shore-ends all submarine cable is laid by these machines.

ABOVE: "Sliding prong" grapnel picks up telephone cable. Seaman is preparing to place underrunning sheave with which cable will be underrun to location of trouble.

ABOVE: Buoy being fitted to mark cable location. Note signal lamp on mast to help cableship locate buoy.

RIGHT: Boatswain ties "stopper" to cable picked up from ocean bottom with "rennie" grapnel by cableship in repair operation. Cable will be brought on deck and trouble "localized."

sibility of damage to cable from dragging anchors. As if such perils were not enough, many of the ocean charts, based on ancient Russian surveys, have been found in error by as much as three to five miles. In this connection the wartime hydrographic service of the Navy and Coast and Geodetic Survey, and the watchfulness of escort vessels have been of inestimable value.

Seagoing Signal Men. Signal Corps personnel are assigned on every expedition. There is always an officer in charge. Depending on the completeness of the civilian crew there may be Signal Corps splicers, testers, cable handlers and supervisors. Numerous short lays in harbor areas have been made entirely by Signal Corps personnel, using barges, tugs, rafts, barrels and other locally available means.

These seagoing signal men have learned much of the lingo of the sea, and have developed sea legs which are sometimes the envy of sailors. A barge has a roll and pitch that baffles many a deep-draft seaman. Some of these signal men had previous nautical experience in commercial fishing or pleasure boating which comes in good stead on these assignments. Others came from fresh water states such as Illinois.

For future repairs and incidental cable-laying in coastal waters, two unique, diesel-powered, small, cable-repair ships are now under construction. Of shallow draft, yet sturdy enough to outride storms, these ships will hold 70 miles of shore-end telegraph cable, or 30 miles of certain kinds of submarine telephone cables. Their cable pickup and payout machinery is being custom-built with the finest of modern gears, controls and accessories. They will be the first cableships completely equipped with American-built machinery, such highly-specialized machinery having in the past always come from England, the home of the ocean cable industry.

Technical Details. Under present conditions, ocean telegraph cable must be brought from the factory across country by rail. It comes in continuous lengths of 50 to 100 miles coiled in coal cars, and is looped from car to car, with the coupling between cars sealed to prevent accidental separation. (Ordinarily, when time is not an element, the practice is to load cableships right at the factory in complete lengths as required.) This cable is seven-stranded single conductor, slightly larger than 12-gauge. There are three common types of armoring, heavy shore-end, light shore-end, and deep-sea, for different bottom conditions. The armor serves two purposes. It provides the strength for holding the cable's own weight while being laid. It provides protection against the chafing action of rocks, sand and tides.

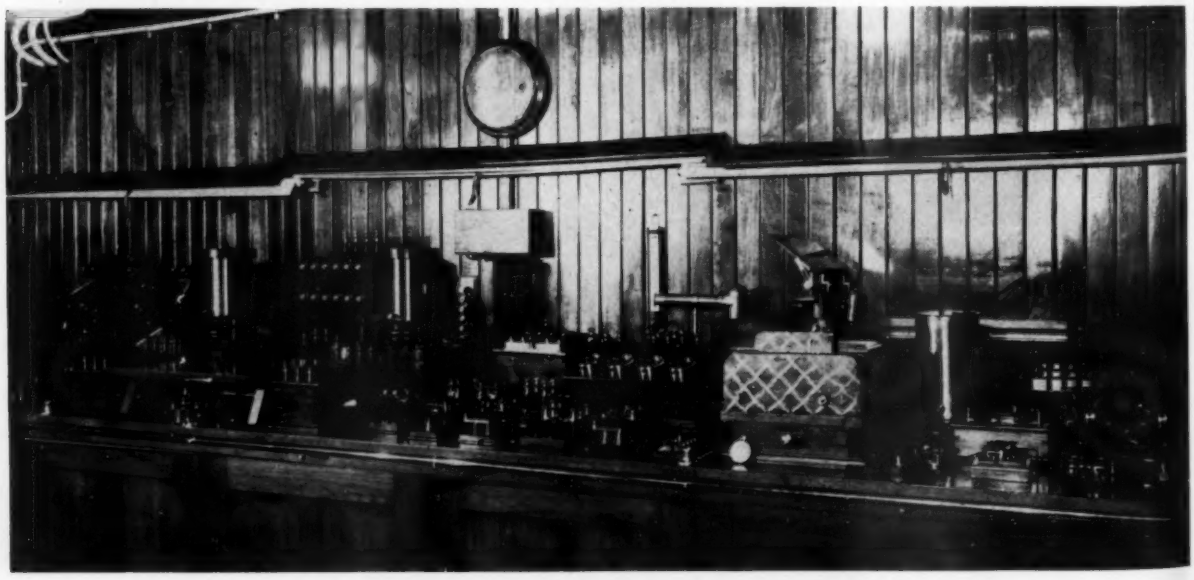
Shore-end cables have heavy armor for such protection. Deep-sea cables have light, high tensile strength armor for laying primarily, since deep bottoms are quiet and usually soft.* Telephone cable comes from the factory in reels of usual commercial size and is spliced as required. Armor varies in weight to meet conditions. Both kinds of cables are carried in the cableship in large round "tanks." The total capacity of the large ships varies, but is in the order of several hundred miles. More deep-sea cable can be carried than shore-end because it is lighter and smaller.

The cable is paid out by means of a huge payout machine having a drum of three fathoms circumference (18 feet). This machine can handle line pulls of 50,000 pounds, is steam-powered and hand-braked to give a smoothly-controlled range of speed from zero to several knots. A train of sheaves and fair-leaders guides the cable over a large sheave on the bow. A dynamometer is in this train to measure the tension. The art of cable-laying consists of so handling the ship that the cable is laid on the desired course without damage from excess strains and with just the right amount of slack.

Too much slack is wasteful and invites "kinks" in subsequent recovery for repair or salvage. Too little slack makes the cable too tight to be lifted out of the water, and may damage it from excessive strain. Tide, wind, weather, visibility, and contour of bottom are some of the variable factors affecting the operation. The navigator in charge must integrate them all by skillful on-the-spot handling of the ship and payout machinery.

Ocean telegraph cable is laid in depths varying from a few feet to 2,400 fathoms (14,400 feet) and more. Lead covered telephone cable cannot be laid safely in depths of more than about 900 feet because the enormous pressure collapses the splices and may even damage the paper insulation. Great depth does not damage telegraph cable because its gutta percha or rubber insulation is unaffected by enormous pressure.

The cableship has a complete electrical testing laboratory including: specifically-balanced wheatstone bridge; reflect-



Cableship testroom. These instruments are of old English design. Newer equipment is more compact.

ing galvanometers (D' Arsonval) sensitive to 1/10,000 of a microampere; scale with lamp; universal shunt; potentiometer; assorted special testing keys such as Rymer-Jones, Cuff, Lambert, Saunders; highly accurate reference condensers; and the sundry voltmeters, milliammeters, batteries, telegraph sets and other common equipment usually found in a testing room. The cable is continuously tested while being loaded on ship and then again while being paid out. During payout there is telegraph communication with shore.

Organized Like Task Force. A cable-laying expedition can be compared with a small task force operation. Extensive advance preparations are necessary by many services, and hundreds of people are involved.

Months ahead, orders are placed on mills and factories for hundreds of miles of cable and associated equipment in approximately the amounts and types to be needed. All charts and records having any possible bearing on future lays, including secret naval and military data, are assembled. Special surveys are arranged for when available information is inadequate.

When specific military requirements materialize, a thorough study is made of particular landing points, depths, types of bottom, tides, distances, dangerous military areas, etc. The advantages and disadvantages of all possible routes are compared and weighed carefully. The type of cable suitable for each type of bottom is considered. A rocky floor, for example, requires a more heavily-armored cable than a muddy bottom. Stocks of cable on hand and factory shipments enroute are checked carefully to make sure the right kind of cable in proper quantity will actually be on hand. Yet sometimes the best-made plans go out the window as military urgency demands immediate use of cables in stock.

Signal Corps field engineers construct the land lines from landings to central offices. They also assist in liaison with local Navy and Army authorities, obtain barges and tugs, and have tractors or troops ready to pull the cable ashore. The Navy is given advance notice for routing and escorting arrangements.

All the above is done while the cableship is still on other missions. As the ship's return date approaches, preparations at the home port are accelerated. Loading plans are outlined to the foreman of the cable yard where up to 150 men are often needed to load a ship. A cableship, like other plants, is always in need of repair or modernization. This is handled by the Army Transport Service which maintains the ships.

When the ship arrives, the cable-loading crew is waiting and any cable not usable on the new mission is unloaded quickly. The Signal Corps officer in charge and the captain of the ship determine the exact amounts of cable to be loaded in each tank of the ship. Loading continues around the clock.

Even as this loading is going on, men of the Army Transport Service swarm over the ship making repairs and installations and provisioning the ship. Everything is geared to the cable-loading schedule. Its completion is the deadline for sailing of the ship, and nothing is allowed to delay departure.

In addition to the current mission, the officer in charge is given tentative future project plans so that he may, if practical, make surveys of probable landings and routes.

Repair operations vary from simple breaks in shallow water which can be repaired quickly with short remnants of cable, to extensive deep-sea breaks which require special preparations and large quantities of repair cable. Elaborately careful measurements must be made at terminals to localize the trouble. The cable is picked up in the hoped-for

Submarine telephone cables are similar to lead covered toll cables but are heavily armored for laying and protection. The paper insulation is double thick and tightly packed to lower capacity and inhibit water seepage. The lead sheath is double thick to help withstand reasonable water pressures.

location of the break, by sweeping across the route with any of a large variety of grapnels best suited to the ocean bottom. Sometimes the grapnel finds the cable on the first pass. Other times many tries are necessary, and bad weather may delay the work for days and weeks.

After being picked up, the cable is cut and further localization tests are made by the ship, with assistance from the terminal if possible. Space does not permit describing the fascinating details of such operations. The electrical tests in fundamental principle are similar to those used by testboard men generally, but in actual application are complicated by factors peculiar to ocean cable. There is only one conductor and its extremely high capacity soaks up test currents so that ordinary types of measurements are unsuitable. The fault resistance often is highly variable because of the chemical effect of sea water.

Then there is always the great uncertainty of weather, and finally the wartime restriction on use of radio communication which prevents continuous contact with terminals for assistance in making tests on board the ship. This is comparable to a telephone lineman not having communication with his testboard.

The Men Behind the Job. The success of the Alaska Communication System in this cable work has been no mere accident or chance. It is a direct consequence of the Army's policy of having the right man in the right place at the right time. The commanding officer is Col. Fred P. Andrews, a regular Army signal officer who for five years was in charge of the old cableship Dellwood including the round-the-world Philippine expedition. He was one of the pioneers in Signal Corps radio, yet he was always mindful of the distinctive secrecy advantages of cable. He has aggressively directed the cable work and supplies the inspiration to get it done on time and right.

Then there is Charles Murphy, the traffic superintendent who has been with the system since the very beginning of the old military telegraph cables in 1900. He has known by first name all the many Chief Signal Officers of the Army from Gen. Adolphus Washington Greely in 1899 to General Olmstead in 1943, and has supplied the experienced guidance for the day-by-day operation and maintenance of the system.

Newer personnel who have played an important part are Maj. J. E. Rice, in peacetime a Western Union engineer who is the ocean cable engineer and has designed all the

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Men advancing under fire, somewhere in New Guinea. Shot from an abandoned Japanese pillbox.

COMMUNICATIONS *In the Pacific*

By Lt. Col. C. J. McIntyre

Born May 28, 1895, in Philadelphia. First commissioned second lieutenant in the Infantry of the regular Army. In World War I, served with the 4th U. S. Infantry, and on return was in command of Company I, 13th Infantry. Captain of Infantry, 1920. Graduate of Fort Benning company commander's course in 1921. Assistant G-3 of 91st division in California until resignation from the regular Army October 31, 1922. Recalled to active service in the Infantry as a reserve officer on November 18, 1940. Transferred to the Office of the Chief Signal Officer September 17, 1941, and promoted to lieutenant colonel in the spring of 1942.

"THE SIGNAL CORPS does considerable work in combat zones," begins a report on General Combat Activities, which continues, "and of a type that corresponds more to combat work than Army Service Forces (Supply and Maintenance) functions.

"During the early stages of the activities the communications personnel of the Army Service Forces established and maintained practically all communications in the —— area. Likewise, in New Guinea, the American communications details were in there and set up *prior to the arrival of any American combat troops.*"

Further information on the signal situation in the Antipodes is furnished by Col. Calvert H. Arnold, now commandant of the Central Signal Corps School at Camp Crowder, Mo. Speaking of conditions he witnessed when Signal Officer in the Southwest Pacific area, Colonel Arnold said upon his arrival in Australia with the United States forces, it was found that the entire continent had to be organized as a base.

And there was only one part of one battalion of signal troops available, and very little equipment; practically all the equipment was being sent to India along with some of the personnel. Consequently, the organization in Australia had to be accom-

plished with the remnant of the one battalion that had been sent there originally, and virtually every item of equipment had to be borrowed from the Royal Australian Air Force. Also, there were no telephone lines in the area, and no lines for the teletypewriter service which was wanted.

Base sections were established in Melbourne, Brisbane, Darwin, Adelaide and Perth. This required the taking over of the functions of housing, supply and administration in addition to the communication nets which had to be established to connect these centers together. Equipment and personnel were utilized for this purpose as they arrived.

The first depot was established in Melbourne where General MacArthur had established GHQ for Allied land, sea, and air forces, and the lines connecting to it also furnished terminals at Brisbane and Sydney. When headquarters were moved to another city, it was necessary to duplicate the communications net at the new location, and also to provide communication facilities for the Navy and the RAAF at some ports. In addition teletypewriter lines had to be run to another center many miles away, Colonel Arnold continued.

So terrific were the termites that steel telephone poles had to be used in virtually all pole line construction as wooden poles would last less than a year. As a matter of fact, in one location a test was made by putting one wooden pole in a row of steel poles. Within four months, the termites had it down.

After the American troops spread to New Guinea, communications had to be extended to keep pace with their advance. Cable was used from Australia to New Guinea, and copper wire on the island itself.

The situation, at first, was extremely difficult, for it was impossible to bring in as much material as was needed; this necessitated the local purchase of every sort of item from batteries and radio sets and components to those of telephones, switchboards and teletypewriters.

At what was then the largest of the American depots, stocks were unbalanced—and it was necessary to keep on hand as large and as varied a stock as possible in order to anticipate the needs which our troops might have, Colonel Arnold said.

This was difficult to achieve, because sailing schedules of boats bringing such equipment were irregular, and landings were not always possible as planned. Ships which were ordered into certain harbors often were unable to reach those ports and had to unload wherever they were able to dock. As a result, checking up on the actual material which arrived in Australia was quite a problem, for a shipment destined for one port might actually be put ashore at another, many miles away, where it would remain in storage and reports of its arrival might not reach headquarters until some time later.

Paying out wire from wire barrel on trailer. This prevents wires from tangling when placed in their proper positions.

Therefore, when it was found that requisitions for Signal Corps material could not be filled from the depot where the equipment was supposed to be, a check of other depots would often reveal the missing equipment. Reserves of widely varied equipments had to be built up in the various depots, and requisitions had to be studied from the viewpoint of future operations in order to make sure that anything which might be needed would be available when the need arose.

Men were kept in the field so that they might make personal observation and reports of the arrival of material, and to discover inadequacies of stock, so that these might be rectified without delay, Colonel Arnold concluded.

Much other interesting information was obtained from Lt. Col. R. Kendall, of the Australian Imperial Force, who served as Chief Signal Officer in Greece and Burma, and as Signal Officer for all signal troops in New Guinea. Capt.

Soldiers hanging telephone line to their camp in Hawaii.

Stringing wire in Australia, showing back of trailer with payout reels.

A message center as seen during field operations somewhere in Australia.

J. E. Hawkins, also recently returned from that area, had additional data on Signal Corps operations there.

Captain Hawkins tells of a novel defense the Japs used on the ridge of the Stanley Mountains, which forms the backbone of any strategic operation that must be conducted in that area. Instead of using barbed wire or other usual form of metal entanglement, the little Sons of Nippon used the lush and tenacious vines native to the region for the erection of their obstacles. The more shells poured into this obstacle, Captain Hawkins said, the more tightly the interwoven vines seemed to cling to each other.

Colonel Kendall tells that originally there was a great shortage of signal materiel and personnel on New Guinea, and whatever equipment happened to be available was adapted to fit such needs as arose. Communications centered around Port Moresby, where GHQ of the occupying forces was maintained. At first, liaison with other points was maintained by radio, but a pole line had been installed from Port Moresby to Buna, and two weeks after the Allies had occupied the latter point, this pole line was being used to carry several channels of voice and teletype communication, according to Captain Hawkins, who adds that native wood, largely palm and gum, was used in the construction of this pole line.

During the first stages of the Allied assault from Port Moresby, communication with the operational force was maintained by radio, but atmospheric interference, jungle screening, jamming and other factors made wire communication extremely desirable, and as progress was made, pole lines were constructed. Frequently the gangs engaged in this hasty installation operated forward of division headquarters.

At first, according to Colonel Kendall, there was a definite shortage of wire, and when it was received, it was normally run forward on the ground; as the ground was almost always very wet, transmission suffered. Usually the wire was transported to location in packs carried by hired natives, and the type of field wire which it was desired to use proved too heavy a burden for the carriers, in some instances, so a lighter type was used in these cases. All this, of course, made for lower transmission qualities.

All power supply in New Guinea had to be provided locally, except in the vicinity of Port Moresby, where some power lines existed. Elsewhere, power had to be generated "on the spot," usually from gasoline-driven generators. Much of the equipment had to be transported by air, so few and difficult were the trails.

Although New Guinea is known to all as rugged country, while Hawaii is thought of as an Island Paradise, the Signal Corps found the going there tough, too, according to Maj. W. S. Green, Jr., who recently returned from these islands. On the large island of Hawaii, construction crews encountered difficult working conditions in establishing wire communications. The men had to drive and march over razor-sharp lava rocks—then had to drill and blast telephone post-holes in solid lava, and even excavate rock caves to make bomb-proof shelters for important exchanges.

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CPL. EUGENE WUENACH, Milwaukee, Wis., operating a switchboard, set up in a dugout, somewhere in New Guinea.

Telephone operator using captured Japanese bunker for protection against enemy fire, while maintaining communication with advance forces.

SGT. H. W. HENDERSON of Montello, Wis., testing a field telephone in the jungle, somewhere in New Guinea.

A line construction crew, members of a signal service company pulling wire tight; somewhere in the Caribbean area.

SICILY "BOMBED" WITH WIRE

"THIS IS BERLIN broadcasting," said the guttural voice of Maj. Heinz Rose on a short wave station beamed to North America. He continued, "In foreign countries there have been a number of speculations about the value of Fortress Europe. These fortifications are not meant as a refuge for a beaten field army but as a springboard from which the Supreme Command, at the most opportune time, may start offensive operations. A network of telegraphonic communications, in multiplied form, prevents interruption of communication between various stations. Power plants supply electricity for these concrete monsters. Besides a system of telephone cables, there is heliograph, and wireless sets for voice transmission. Bundled short-wave is directed by aerials so the enemy cannot listen in. There is other equipment for transmission so the central direction of operations cannot be interrupted. . . ."

That is what the Germans were saying—but they were saying it before the invasion of Fortress Europe began—before the Americans, Canadians and British had battered their way across Sicily, onto the shores of Italy itself. But when the invasion began, the Germans were swift to destroy their much-vaunted impregnable communication lines. They were snipping their telephone wires into short lengths and sawing off their telephone poles a couple of feet above the ground, in order to prevent the use of these facilities

By Capt. Milton B. Herr

Born in Philadelphia on March 15, 1898, Captain Herr has spent most of his business life with the telephone industry in editorial, advertising and sales promotion capacities. In World War I he enlisted in the U. S. Marine Corps Reserve and spent a year in active service. From 1924 to 1934 he held a commission in Military Intelligence Division, Officers Reserve Corps. In July of 1942 he reentered service and was assigned to Office of the Chief Signal Officer.

by our advancing armies. Of course, it was the work of the Signal Corps to repair and rebuild much of the damaged communication system.

Although the terrain in Sicily and other portions of the Mediterranean area was less impenetrable than the jungle fastnesses of the tropics, other and different problems arose. One of these was the fact that Sicily was strongly manned by enemy troops, and landings had to be made in the face of strong resistance. Once landed, the Allied armies had to spread rapidly over the land, and had to maintain communications while they did so. This required both radio and wire networks *before* the arrival of the main bodies of invading troops.

So Sicily was "bombed" with miles and miles of telephone wire. The wire, in reels, was dropped attached to parachutes; paratroopers and airborne signal men leaped after it, fought off the enemy, and laid the lines. When the masses of U. S. troops arrived, their communications were already set up, prepared for operation. The triple attack—U. S. troops at Gela, Canadians at Pachino, and British at Augusta—was coordinated. And Sicily fell.

The whole thing is not so simple as that, however. Here is a typical—though not actual—example of how Signal Corps troops function during an amphibious invasion.

A division signal company, along with the usual infantry, artillery, and so forth, forms a part of an Army division. The signal company includes numerous specialized sections, including besides telephone and telegraph, radio, intercept (for listening in on the enemy's communications), direction finding (for locating his radio transmitters, in order that they may be destroyed), construction, service and repair, and maintenance. It is the first two which will be of most interest to the readers of this magazine.

Classic statue of a goddess aiding the Allied war effort by holding field wire for American troops in the Villa Garibaldi, Agrigento, Sicily.

As the attack of Air Force bombers and fighters and Navy guns on the beach comes to an end, rangers and commandos rush ashore, with assault troops close behind. Normally, the signal units land with the assault troops, though this is not an invariable rule. Short-range, extremely portable radio sets are usually used by the shock troops to keep in touch with each other, with supporting aircraft, and with their headquarters on the vessels off shore.

As the troops gain territory, communications are spread out. More powerful radio sets are used—and wire comes into the picture. Assault wire, a thin, light wire, is laid either on the ground or in trees, to link the command posts of the various assault battalions. When more depth is gained, and communications must be expanded, the fragile assult wire is replaced by regular field wire, which is tougher and heavier—capable of being used over longer distances and less likely to break.

Then, when a town or so is taken, a Signal Corps telephone team takes over the local commercial telephone and telegraph systems, making any necessary repairs to existing facilities, and establishing such new facilities as may be required. The latter will include rapid pole-line construction for overhead wire, and the laying of special spiral-field cable; sometimes one is used, sometimes both are necessary.

In many instances, the captured telephone or telegraph lines will not terminate conveniently in the captured territory, but will extend in back of the enemy's lines. Obviously, if communications were carried on under such conditions, the enemy could listen in. So special wire crews are sent to the extreme limits of our advance; there they bridge the circuit, tapping the line and connecting the taps with field wire.

They do not do this work in any degree of comfort and security, for the enemy realizes the importance of communications and attempts to hamper and destroy the Signal Corps in every way. The setting up of communications is, in a large part, fighting off enemy attacks. This was recognized by no less a figure than Lt. Gen. George S. Patton, Jr., who, according to an Associated Press dispatch, said he was delighted with the fighting qualities displayed by his men in Sicily, and expressed particular appreciation for the men of the Signal Corps, who, as he put it, often had to work "without food, favor or affection" to construct and maintain communications which he characterized as highly effective.

One story typical of communications work in Sicily was reported by a staff correspondent of the Washington Star, who tells of Corp. Ben R. Austin, a wire layer. Austin received a bullet through his helmet the day after the Allied landing near Licata on July 10. On this occasion he was under heavy enemy fire while laying a line to connect the shore party with the beach head. When the bullet struck, Austin merely shoved his helmet straight again and went on laying wire as though nothing had happened. He next came to notice on August 1, outside of San Stefano, where it was necessary to lay a wire across a heavily mined dry river bed. The engineers had not yet had time to clear a path with their mine detector equipment, but Austin volunteered and proceeded to lay the wire. On August 3, wire was needed down a steep mountainside which the enemy

Signal Corps lineman in Bermuda.

Switchboard central in a dugout.

was pounding with artillery; Austin did the job again.

Then came the battle of San Fratello Ridge, where Nazi resistance finally crumpled on August 11. In three days (August 7 to 9) prior to this, Austin worked without rest, laying and repairing wires while under heavy fire, to help pave the way to victory. Scarcely was a wire laid than it was cut by the German artillery, but as soon as a line went dead, Corporal Austin was out to repair it.

Mines were mentioned a few lines above. It became the practice of the retreating Germans to plant anti-personnel mines near the bases of telephone poles in abandoned territory, the idea being that linesmen, attempting to string wire on the poles, would set off the mines and be blown to bits. So Signal Corps men—among them Lt. Sam Center and Lt. Wendell Boston, both former employes of the New England Telephone & Telegraph Co.—had to locate and deactivate Nazi mines as they proceeded with their line construction. The two officers just mentioned were operating in the Gafsa area at the time when they were interviewed by a United Press correspondent.

Not much can yet be told about the work of the Signal Corps in Italy, where the campaign is still in progress, save to say that the Germans, as they are forced back, attempt to destroy all existing communications and other facilities, and to make their repair as slow and dangerous as possible. The most generally employed method is the use of booby traps, and these are concealed with fiendish ingenuity.

Switchboards in local telephone stations may be smashed and debris heaped upon them. If the debris is removed carelessly a mine will explode. Then, if another careless soldier attempts to repair the board, another mine may explode. Or a switchboard may be left in apparently perfect condition, as though the former operator had fled without taking time to sabotage it—but if a trusting soldier attempts to put it into service without inspecting it thoroughly for deadly devices, the act of putting in a plug may send him hurtling into eternity. As a result, Signal Corps troops are very careful; they have to be if they want to stay alive.

As the Allies advance in Italy, they are finding that the Germans have learned at least one lesson from the Russians: that of the "scorched earth." As the Nazis evacuate a town, they reduce to rubble everything which they

T-5 HUDSON THOMPSON, Lincoln, Ill., and T-5 JAMES PLA., San Diego, Calif., "sagging" wire at Mazzara, Sicily. They are from the 1st Armored Signal Battalion and attached to British 8th Army.

have the time to destroy. Their first concerns are strong points, means of transportation, and means of communication. The latter means more work for the Signal Corps, for while a captured enemy radio station can be turned to the service of its captors with little delay if it is undamaged, a systematically wrecked installation may be more trouble than it is worth. Then transportable radio facilities are moved into the area—it is an easier and cheaper procedure than attempting to rebuild a sabotaged system.

The same is obviously true of telephone central offices, and the Signal Corps has developed equipment which may be hurriedly brought into position and set up, so that adequate communications can be established without delay. It is the function of the Corps to see that communications are set up wherever they are required, and maintained in such condition as to be operable whenever they are needed. The Signal Corps uses many means to achieve this end; these range from pigeons, signal flags and heliographs all the way up to complete radio broadcasting networks and national telephone systems.

The Signal Corps gets the message through.

SIGNAL CORPS IN AFRICA

Signal Corps linemen stringing wire through Mateur, Tunisia, North Africa, a few hours after forward troops had taken the town.

By Robert Eichberg

Born in New York, N. Y. Became active in radio industry in 1922. Among work was Publicity Manager of Station WGBS, Director of Extension Division of Federated Radio Trade School, Technical Radio Editor of New York Evening Graphic and New York Evening World. Trade Editor of Radio-Craft, Television & News Editor of Radio & Television, author of about a dozen books on radio, including Radio Stars of Today, contributors of millions of words to dozens of national magazines. Entered employ of War Department early in 1942.

AT 8:00 a.m. on November 8, 1942, the first of the main body of United States Infantry dashed ashore at Santleu on the coast of French North Africa. There they met—not hostile troops, not friendly natives, but a group of Signal Corps men dug into the sand and busy operating a telephone. Along with the advance Infantry units and a body of Rangers, the Signal Corps had landed seven hours earlier, to assure that communications would be established and in operation when needed by Army forces.

Communications, as has been said so often before, are especially valuable in this war of movement, and nowhere did they prove their worth more than in Africa. Large territories had to be spanned with wire in order to keep widely-separated units in touch with each other and with command headquarters, so that their tactics could be constantly coordinated.

True, radio was used extensively, but wire communications are in many ways superior for military operations. This is true for several reasons, among them the fact that wire is not subject to "jamming" (artificially created radio interference), it affords greater secrecy, it is less likely to attract the attention of the enemy, and is more dependable. On the other hand, the installation and maintenance of wire line is a task which is both arduous and hazardous.

A good picture of the signal situation in the African campaign is found in a report from Col. T. J. Tully, Signal Officer of the 2nd Corps. Colonel Tully wrote:

"As I dictate this letter in our field set-up here in the woods tonight at 2200 o'clock (10:00 p.m.), we are in the midst of a very mobile, very fast moving operation with a very fluid front. This operation might be compared to a football game where the Corps Command is in the position of quarterback, well back of the line of scrimmage, directing a play with its full force on one end of the line; and then, without waiting to call a new set of signals, the play is suddenly shifted to the extreme opposite end of the line—some dozens of miles across from end to end.

"At the moment, the Corps Wire Officer is making his shifts of circuits by a series of telephone calls to various key points where, with the aid of an interpreter, he hopes to switch over the connections necessary to insure telephone and telegraph service at the other end of the lines for the major units within the next three hours. The Corps Radio

Officer is also at the telephone arranging details to cover emergency radio communication on one end of the line where the enemy has suddenly withdrawn and where communication at the moment is rather uncertain, since wire installations had not been completed.

"Corps radio, wire, teletypewriter and message center teams are moving at this moment to the other end of the line, to an advance Corps signal center being established there, from which we will give more detailed instructions to the teams later tonight as the tactical plan unfolds. . . . By midnight we hope to have both ends of the line well in hand.

"Such a change of tactical plan introduces new controls, as units normally operating under division control suddenly revert to Corps control while still in the field of battle, and units under Corps control switch to division control. The very few open wire commercial circuits available must be assigned to all the different services in the area. Since all circuits are always in use, this presents a trick wire problem. This office controls the assignment of all commercial long line facilities in our area of operation.*

". . . I am convinced by this time that successful communications depend upon getting the actual means of communication under way even before the staff has completed its plans. Such success as we have had to date is due mostly to a thorough anticipation or a damn good guess as to what somebody else will decide later. If the signal officer waits for the staff's decision before planning his communications in an operation of this kind over such distances, it might be too late. . . .

"Field wire does well within its normal range. In this operation, which involves dozens of miles at a time, field wire is used chiefly to extend, for short distances, open wire circuits that we are able to use. The field telephone is doing a fine job. We are making some use of the repeater on some of our longer circuits where several switchboards or some field wire come into the picture.

"In our present operations, the power units for the radio sets, switchboards and other equipment are getting a real 23-hour-day, seven-day-week workout. . . ."

But the big distances were not the major problem in Africa; it was, on the contrary, something very small indeed. It was, in fact, those ancient enemies of Charlie McCarthy: *termites!*

According to Maj. L. J. Simonich, of the Office of the Chief Signal Officer, these insects presented the greatest problem in pole line construction. So destructive are they that a telephone pole will last only about a year unless it has had its base treated with chemicals, or provided with a metal skirt. And one story from Africa has it that within

*While commercial lines are often pressed into service, these are usually inadequate for military work, and additional lines must be installed.

View of telephone line and wreckage of 12th Century Turk Fort in Tunisia, being repaired by signal battalion.

Members of communications outfit tap enemy lines. On telephone, CPL. M. A. GREGG, Cable, Ohio; on pole, SGT. J. M. HOGGS, Pottsboro, Tex.

A battalion moving up to the front at Berteaux, North Africa.

Shore regiment, battalion headquarters, switchboard, ditched in field back from beach, Les Andalouses, Algeria, North Africa.

Soldiers laying wire communications in Africa.

Supply section of a U. S. fighter unit in North Africa operates from a dugout. (L. to R.) SGT. B. ANDELL, Wagner, Okla.; T/SGT. L. W. BUHRMESTER, St. Louis, Mo., and CPL. R. CASKEY, Briggs, Tex.

two days after the Signal Corps started putting metal shields on pole bases, a termite was seen at a Post Exchange, trying to buy a can-opener.

The Signal Corps, however, has more regard for metal than that. Telephone company advertisements in consumer journals have mentioned the scarcity of wire and urged its conservation. It is true that while the Signal Corps is one of the biggest users of telephone wire, it is likewise one of the most economical. Witness a statement from Lt. Col. P. W. Thompson, who wrote on "Close Support in Tunisia" for *The Field Artillery Journal.*

He says, speaking of the use of radio, "We were continually improvising new nets to save wire. . . . In case the wire went out, the radio would set up on this (battalion) frequency until the wire was in, or until another station reported in. . . . Officers and men were inclined to disregard telephone secrecy at first, but inasmuch as the British used ground return, and long lines could be tapped, secrecy had to be stressed.

"One of the first things a German patrol did was to cut all wire lines. Two linesmen had a narrow escape one night trying to fix the break: they were caught between both fires. When lines go out in the forward areas at night, radio contact should be established and the situation ascertained before sending linesmen out far forward."

Two can play at the line-tapping game, however. The British, up against strong German opposition in one area, listened in on a Nazi message. The German Luftwaffe was instructed to bomb a British installation at a certain hour; the Nazi planes would find their target easily, the message continued, for the German artillery would ring it with smoke shells to mark its location. When the hour came, the British rained smoke shells on the strongest installation which the Nazis had in that area, whereupon the Stukas proceeded to dive-bomb their own men off the map.

The Nazi planes were quite a nuisance to Signal Corps linemen in Africa—but sometimes it was the other way around, too. For example, Pfc. D. S. Johnson was on a wire-laying mission, the members of which were having lunch when a Messerschmitt appeared and started its machine gun chattering. Other members of the party stayed in the safety of the ditch, but Private Johnson, perhaps remembering how another Signal Corps man, Pvt. John Smolkovich, had downed an attacking plane with a machine gun snatched from a landing boat during the initial landing in North Africa, ran to the nearest wire-laying truck, where he knew a machine gun was mounted. Johnson fired at the plane, which went away only to return again and again, each time to be met with a blast from the gun on the truck. Its wings pierced by numerous tracer bullets, the German plane finally turned and fled; when last seen, it was rapidly losing altitude. It is believed that it failed to reach its base.

There have been numerous casualties among communication personnel, many of them occurring during lulls in the fighting, when the communication men work so close to the front that they may find themselves literally between the lines. And here's a story that proves how close to the front the Signal Corps works.

Our artillery, up north of Lake Achkel, which is to the west of Bizerte (the home of Dirty Gertie) was in a position to fire on the Nazi troops who were blocking the advance of the United States forces. But, though another group of troops on a newly-taken hill could see the German positions, the artillerymen could not, and so were unable to give their fire the deadly accuracy which normally characterizes it. The situation was this: one group could see the target but had no artillery; the other had artillery, but couldn't see the target. And there was no way of communicating directly between these two units.

Lineman of a signal battalion company repairing wire and having anti-aircraft protection in North Africa.

But the Signal Corps exercised the ingenuity for which it is famous. From the crest of the hill where the observers lay, a telephone call was routed over Army signal lines to a switchboard 100 miles in the rear, and thence forward another hundred miles to the gunnery position. In a few minutes an observer was calling the shell bursts, the artillery pinpointed their fire, the Nazis retreated, and the American advance rolled on.

Lines as long as this are always a problem, and resort is made to them only when necessary. Besides the usual difficulties encountered with lengthy stretches of hastily-installed wire, Africa produced some brand new ones. At a headquarters signal office on the Tunisian front, an important communication line suddenly went out and no one knew why. A sergeant went out and traced the wire until he had found the difficulty, which he found right near the headquarters itself. It seems that a drove of camels had been turned out to graze in a nearby field, and were eating the wire with considerable gusto. The camels were chased away, and the line was as good as new after a few minutes' work.

Telephone lines not only aided in the interlocking of the American, British and French drives, but they provided visual proof of the close coordination between the armies of these three countries. There still stand telephone poles in Africa, bearing the insulators distinctive to each country—a sign of the unity of the United Nations—a unity which is crushing the Axis into oblivion.

Wire line construction by the Fifth Army in the Italian campaign.

The DUKW mounted. Radio sets housed in especially constructed shelters were mounted on this latest amphibious vehicle of the Army and the DUKWS were launched over sides of ships and driven to the beaches in Allied landings.

Signal Communications

IN THE

5TH ARMY

★

SOME of the experiences of signal and communication troops in providing service for the Fifth Army in its Italian campaign may be of interest to readers of TELEPHONY. Before commenting on some of the signal practices of the Fifth Army, it may be helpful to the reader to mention the unique organization of the Fifth Army. This is the first United States Field Army that may be said to be truly international. It comprises both British and United States troops. Fortunately there is a common language which eliminates many difficulties in signal communication that would be present otherwise.

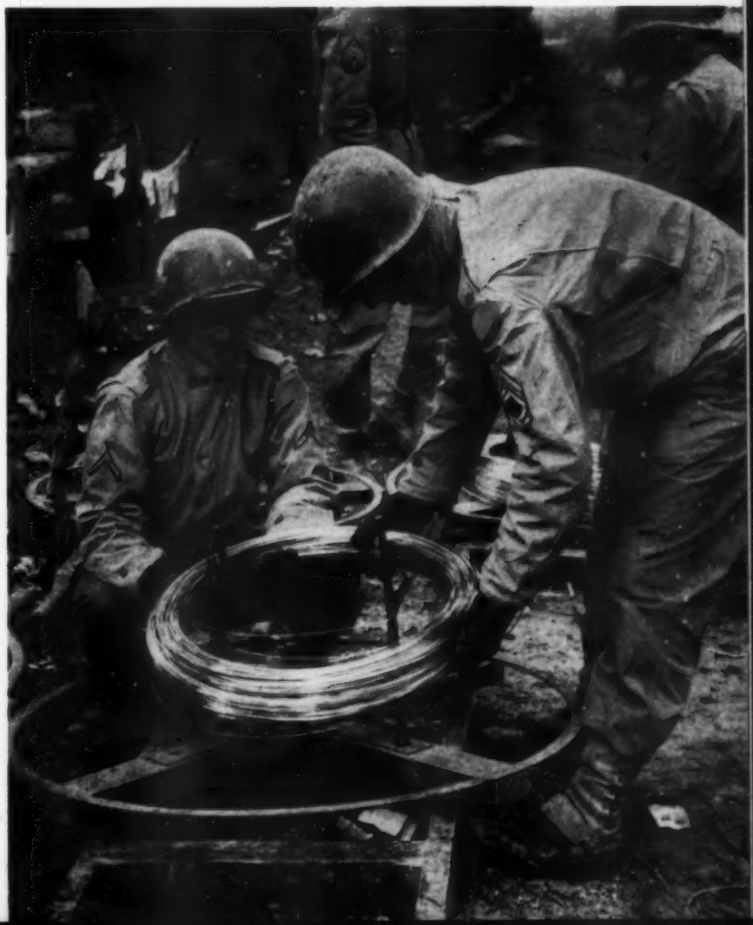
Naturally practices differ in the two components. However, the United States and British signals have become welded into one smooth-working communication system. The most cordial and close relationship exists between the signal officers and signal troops of the different forces. Each has learned many things of advantage from the experience and procedure of the other. All United States signal personnel know now that "field cable" in British terminology means field wire, that a "cable jointer" is the same as a cable

By Brig. Gen. Richard B. Moran

Born at Florence, Colo., November 26, 1895. Commissioned first lieutenant April, 1917 and first lieutenant regular Army July, 1920 and promoted to captain same date; to major August, 1933; to lieutenant colonel July, 1940; to colonel December, 1941; to brigadier general (temporary) December, 1942. Graduated from Infantry School in 1923, Signal School in 1924, Command and General Staff School, Fort Leavenworth, in 1935 and Army War College in June, 1939, when he was placed in charge of War Plans and Training Division Office of the Chief Signal Officer. Assigned to general staff duties in headquarters at Army War College in Washington in May, 1941 and in December, 1942 he went overseas.

Getting wire ready for line construction.

Signal Corps men building line somewhere in Italy.



Reconnaissance for line route.

Fifth Army message center is kept busy.

Carrier equipment, Signal center, Fifth Army.

splicer and that wire sizes are usually expressed in pounds per mile rather than in terms of wire diameter.

From the time of departure of ships on their way to the beaches at Salerno, to the present moment signal troops have had a full time job. Due to careful planning, adequate equipment and well trained personnel, communication was effective. Radio of course carried the initial load until the installation of wire could begin on the beaches.

In addition to the smaller types of radio sets which could be carried ashore, radio sets SCR-499 housed in especially constructed shelters and mounted in the Army's latest amphibious vehicle — the DUKW — were launched over the sides of ships and were quickly on their way to the beaches. They traveled over the beaches under their own power to nearby roads. There the shelters containing the radio installations were transferred to two and one-half ton trucks, thus releasing the DUKWS for unloading ships. These sets made possible the early establishment of reliable radio circuits.

After the arrival of Army headquarters ashore, the demand for wire circuits arose almost immediately. All open wire had been destroyed. Fortunately, a section of railroad underground cable was discovered, which was of material assistance. Rehabilitation of open wire circuits was undertaken at once with the limited number of signal construction troops available. In the area of the landings most of the poles remained standing although the wire had been torn down. The heavier leads ran along railroad rights-of-way, often on "H" type pole fixtures fitted with angle-iron crossarms, steel pins and porcelain insulators.

These lines were rehabilitated as rapidly as possible with salvaged copper wire. There appeared to be no transposition scheme employed, but after closer examination, a form of transposition was discovered consisting of a 180-degree roll of two wires of a group. The group consists of two circuits arranged as indicated in *Fig. 1*, the diagonal wires of a group forming one circuit.

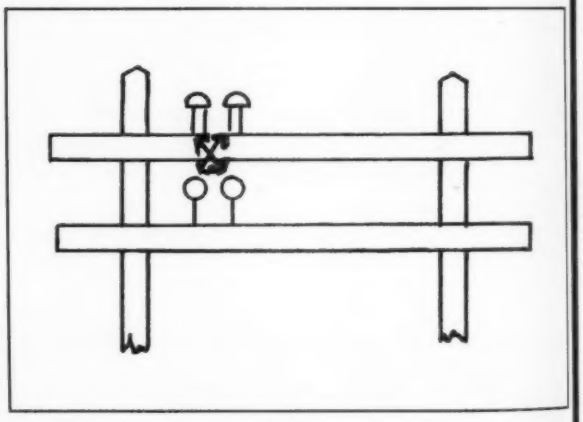


Figure 1

Transpositions are not accurately spaced due to the wide variation in pole spacing. Intervals between poles vary from 150 feet to 250 feet. In spite of this rather hit and miss system of transposing, it has been possible to operate three separate carrier systems on three groups, all on the same pole line. As the Army progressed further to the northwest, systematic destruction of pole lines by the Germans was evident. Not only was all wire torn down and badly cut but also every pole has been found cut or broken off. This necessitates completely new construction. In addition, all pole routes are heavily mined. Some booby traps

have been discovered attached to masses of tangled wires on poles. These difficulties make the work of construction crews slow and dangerous.

Much of the wire communication of peacetime Italy was carried by state-owned underground cable. None of these facilities have been available to the Army because of extensive destruction at manholes and demolished bridges, and the serious damage to repeater stations, terminal equipment and loading pots.

The use of the Army's CF-1 and CF-2 carrier systems has proved invaluable. They are used on all circuits between the Army and its corps, to rear establishments and even down to divisions in some cases.

Spiral-four cable, which is a rubber-covered cable designed to employ the CF-1 and CF-2 carrier system, has been installed in lengths as long as 40 miles and gives reliable service over long periods of time. The cable must be suspended from messenger, no strain must be permitted on connectors, and all connectors must be thoroughly cleaned. The joints must be rubber taped to prevent the entrance of moisture.

In the forward areas, wire W-110 and W-130 give excellent service within the limits of their respective ranges. Field wire repeaters EE-89 have proved to be of considerable value in extending the useful range of field wire. Long range field wire has proved to be excellent and thoroughly reliable.

Telephone switchboards of all types are giving excellent service. At Fifth Army headquarters, telephone central office equipment TC-1 has been mounted in large van trailers. This type of installation is proving quite satisfactory. It saves much time when the command post moves. At Fifth Army headquarters, two TC-1 central offices are required to serve 180 subscribers.

With the exception of the central office equipment mentioned above, all equipment at the signal center, Fifth Army CP, is habitually installed in a building to provide essential shelter from rain and dust. In some of the lower units, equipment is operated in tents, while in others it is mounted in trucks and trailers.

Many requirements for radio circuits present themselves which are not visualized prior to an operation. The traffic is so heavy over many circuits that it is impossible to operate in nets. Instead, point-to-point operation is required.

One of the most important requirements of the Army and Corps commanders is early information of the front line situation. Reports through normal command channels require considerable time to filter back. A staff information service has been established to secure and forward this information to the higher headquarters.

Pigeons are playing their role in this operation. A large number of birds are released from forward elements each day, bringing messages to their mobile lofts from which the information is immediately transmitted to the proper headquarters.

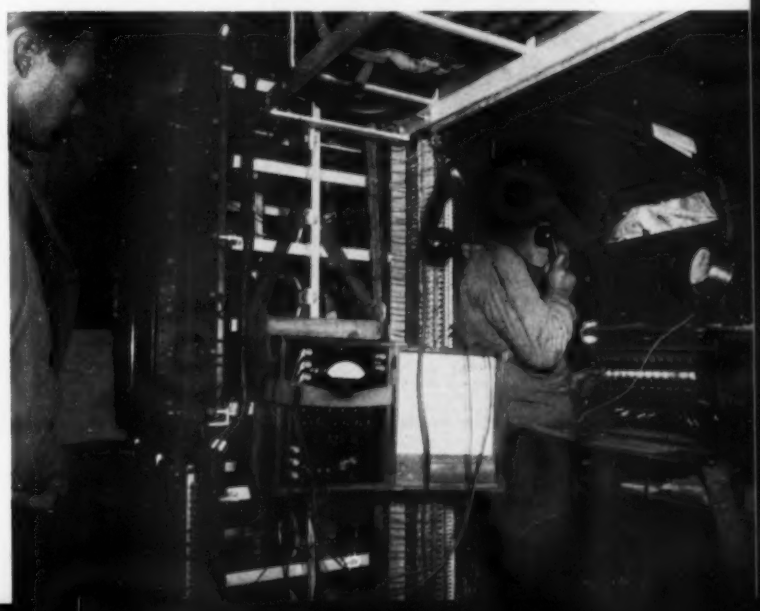
Signal Corps photographers with the Fifth Army are keeping the people at home informed of the progress of the Army, through the medium of both still and motion pictures. Each evening still negatives are received at the Fifth Army photograph laboratory where they are developed and necessary prints made. They are then rushed to North Africa by plane the following morning, placed on the radio facsimile transmitter and are received by the press at home that evening.

Altogether, Fifth Army "signals" are doing their part to bring this Italian campaign to an early and victorious conclusion.

Typical Italian terrain. Artillery fire in distance.

Signalman pulling in wire.

Telephone central installation in semi-trailer.



COMMUNIC

Communica

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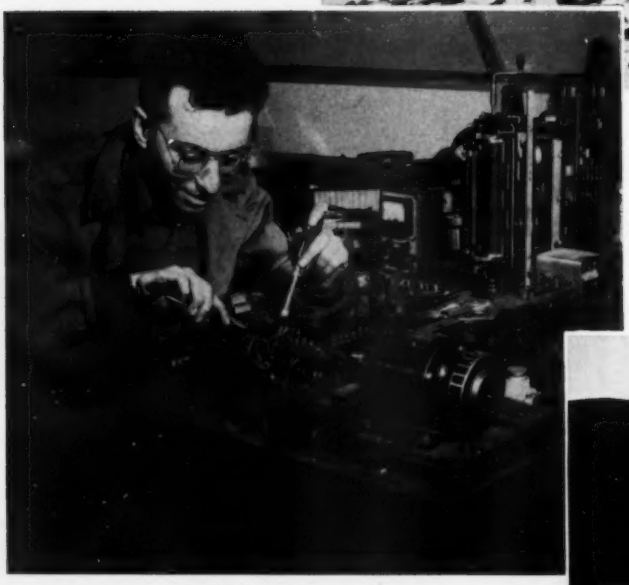
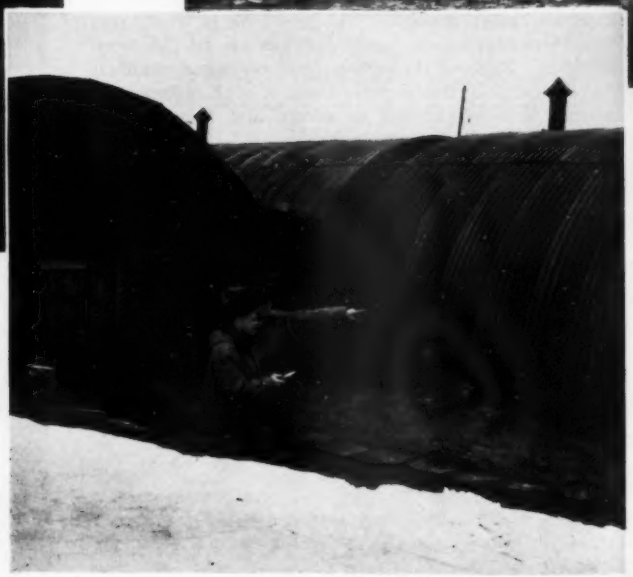
This photograph shows the new telephone exchange somewhere in Iceland with four men handling approximately 7,000 calls in 24 hours. Note all men must wear guns.

(LEFT): Telephone line construction in Iceland.

(BELOW): Signal troops in Iceland carrying a 60-foot antenna pole across the camp to be erected behind the radio hut.



TECH. 4TH GR. BERNARD CANE of the teletype repair section is shown repairing a teletype machine in Iceland. Machines are completely torn down and inspected for any operating deficiencies that might exist.



(RIGHT PHOTO): HOWARD P. DONAVON (pointing) and CAPT. HOWARD E. PRICE are standing in front of the new telephone exchange making further plans, somewhere in Iceland.

C|ONS
tions
I|CELAND
Iceland

(ABOVE): FIRST SGT. WARREN M. CANNEFAX taking a message over the field telephone during a recent test of communications at a North Atlantic base.

(RIGHT): During maneuvers in Iceland, S/SGT. ARNOLD A. GOLDEN of New York operates a field telephone while a guard in background keeps watch.

Men of the Signal Section erecting large pole for radio antenna in Iceland.

(RIGHT): T/4TH EARL J. STEWART of East Moline, Ill., who worked for the Illinois Bell Telephone Co. for nine years before going into the Army, is seen putting cable pasters on before wiping joint, somewhere in Iceland.

CANADIAN "LONG LINES" CABLE

By R. S. Boykin
Signal Corps Engineer

Crew tightening anchor guy on pole in Canada.

ONE of the largest and least publicized Signal Corps telephone projects, made necessary by the present conflict, has been the construction of a 500-mile toll cable in Canada. The existing communication facilities operated by the Canadian government were unable to furnish appreciable assistance in satisfying military communications requirements. These existing facilities also were subject to severe service interruptions, sometimes three and four weeks at a time in the winter months.

Numerous military radio installations were not entirely satisfactory as they were out of service frequently, due to severe magnetic disturbances. It was, therefore, decided that the United States Army Signal Corps would contract for the construction of a large network of telephone facilities to interconnect the various military establishments.

Preliminary layout of the system was carried out by the Signal Corps in the early spring of 1942. The Long Lines Department of the American Telephone & Telegraph Co. and Bell Telephone Laboratories then completed most of the detailed engineering of the outside plant and repeater stations involved. It was decided that the backbone of the communications system would be approximately 500 miles of aerial 19-gauge quadded cable and that 250 miles of open wire also would be constructed to provide service to several outlying points. This system required construction of 10 repeater stations.

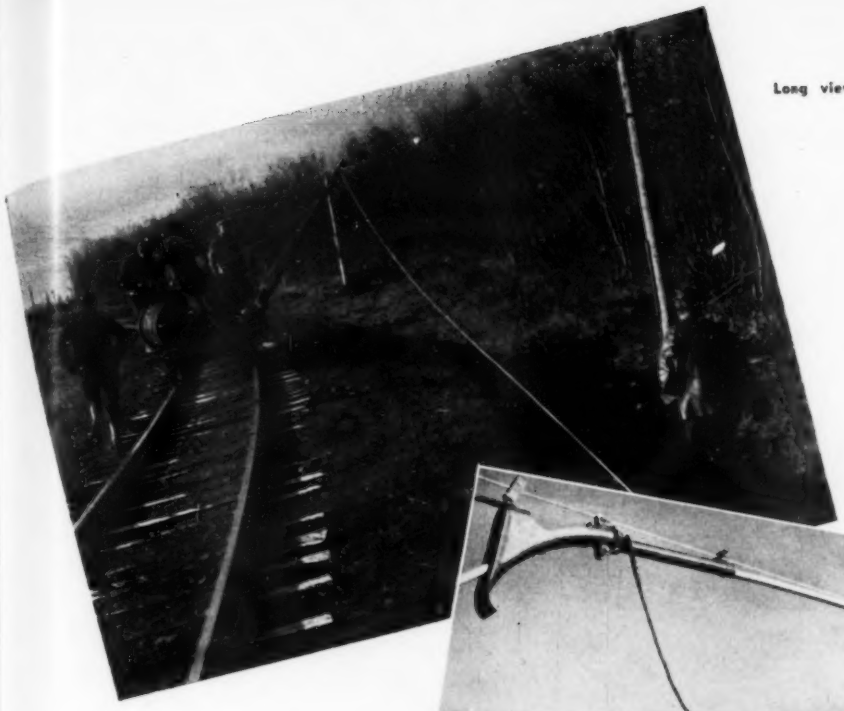
This area is subject to very severe weather during the winter months during which the snow fall is very heavy and drifts completely cover telephone poles and wires in many places. Heavy sleet storms, accompanied by high winds, almost invariably occur every winter and resultant damage to poles and wires is always considerable. With such weather conditions existing, it was decided to use cable on extra heavy poles and lashed to 10M-messenger although the largest size cable to be installed would be 44 quad. Frequent storm guying and use of reinforcing straps and links were also planned to add to the strength of the line. Poles were to be native spruce averaging 20 feet in length with a minimum of seven-inch tops.

Contracts were made with the Bell Telephone Co. of Canada for construction of 400 miles of cable and pole line; and with the Western Union Telegraph Co. for construction of approximately 100 miles of cable which would be attached to existing Western Union poles. A contract was also made through Graybar Electric Co. with the Western Electric Co. for the installation of equipment in the 10 repeater stations. The Corps of Engineers was assigned the work of constructing the repeater station buildings and a number of temporary camps for housing construction crews. The Signal Corps was to purchase all material and construction tools required for the contractors and to construct the 250 miles of open wire.

By May of 1942 the Bell of Canada and Western Union had line-locating crews at work and some of the material had begun to arrive. Due to scarcity of materials and very limited shipping facilities, full-scale construction was not under way until October, 1942.

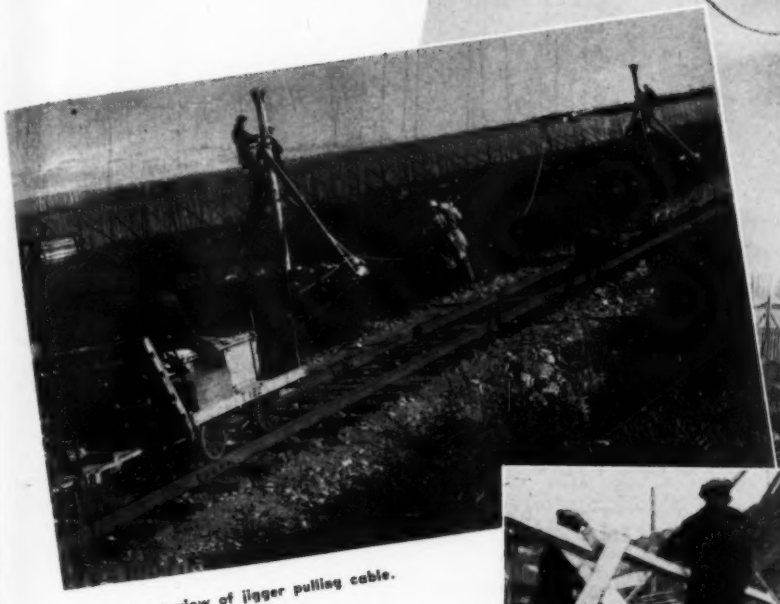
The greater part of the cable route was along a railroad right-of-way. This railroad was already overburdened with wartime traffic and was having difficulty obtaining enough rolling stock to take care of existing business. However, they were able to furnish work trains for the delivery of poles and materials. Also, one work train was provided which, by an ingenious arrangement devised by the Bell of

(Please turn to page 114)



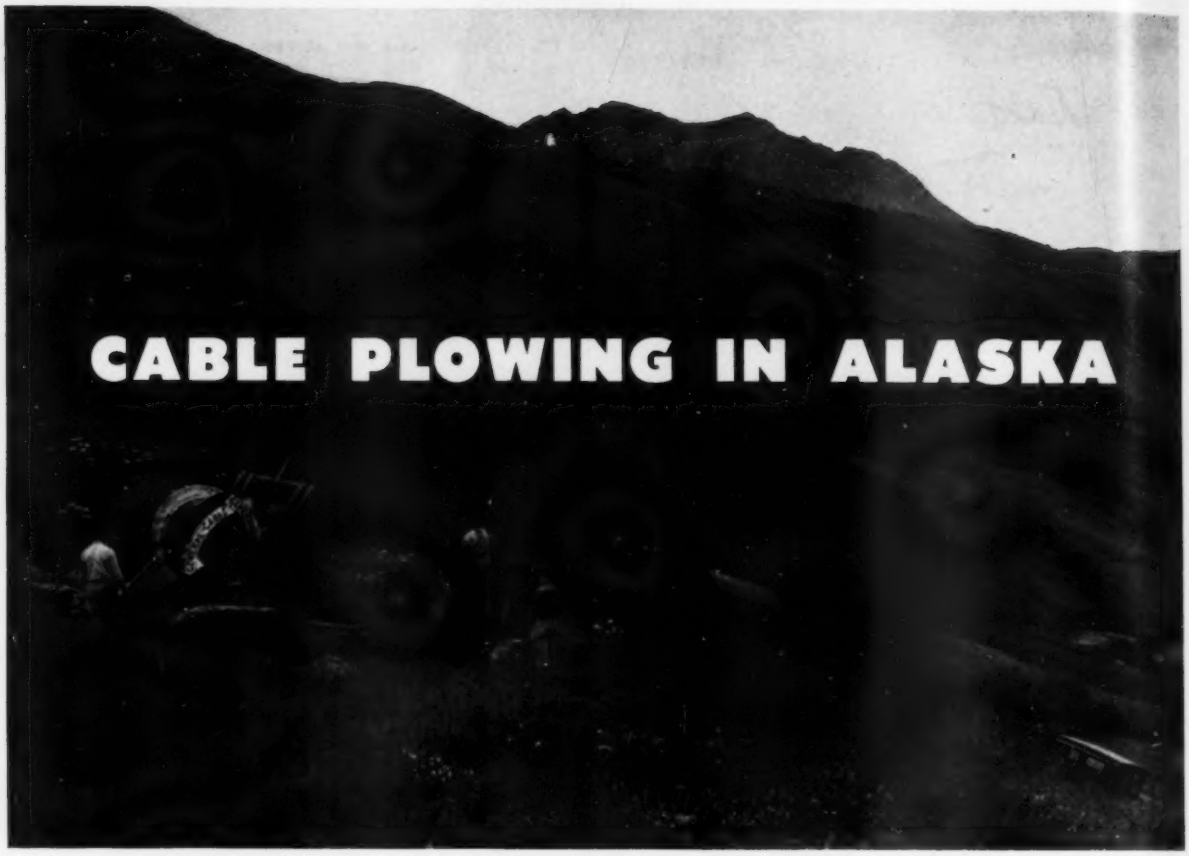
Long view of jigger paying out strand wire along pole line in Canada.

Inserting new spool of wire in cable lasher.



Long view of jigger pulling cable.

Laying conduit for underground cable in Canada as part of general cable project.



CABLE PLOWING IN ALASKA

By Maj. Wm. V. Sayner

Born in Vienna, Austria, August 3, 1903, graduated from University of Nebraska in 1927. In June, 1927, he was commissioned second lieutenant, Infantry Reserve. Promoted to first lieutenant, July, 1930. Attended the National Guard and Reserve Company Officers Course, Fort Benning, Ga. In January, 1936, promoted to captain. Ordered to extended active duty in the Signal Corps, and assigned to Plant Division, Office of the Chief Signal Officer, April, 1942. In August of that year named Fire Control Officer, Alaska Communication System. Promoted to major (temporary) March 25, 1943. From 1927 to date of active duty, he was associated with the A.T.&T. as engineer and staff supervisor.

WITH raised eyebrows last December the Plant Engineering Agency scanned a requisition from the Alaska Communication System for a cable plow train to consist of a C-48 plow, two cable trailers, a heavy rooter, and two D-8 tractors. The C-48 plow was known as the Bell System's heaviest, weighing 10 tons, and designed for burying long toll cables in rolling prairie states. And Alaska, well, who hadn't heard that it was a land of mountains and muskeg!

Approved more on faith than conviction, the train in due time was assembled at Seattle. The plow came fresh from the transcontinental cable project, balloon tires, tracks and all, just as used on the salt flats of Utah. The tractors and trailers came from Pacific coast jobs related to the transcontinental cable. A heavy two-wheeled rooter of the road-breaker type was purchased. A complete stock of repair parts, towing cables, winch lines, tools, etc. was also procured because such items would hardly be available at nearby Alaska trading posts.

Two expert plow and tractor operators were loaned by the A.T.&T. Long Lines Department to start operation of the train and to instruct Signal Corps personnel in its use.

After considerable delay in shipment to Alaska due to difficulty in getting shipping space suitable for such heavy cargo, the units of the train one by one reached the project. Initial results were discouraging. Snow covered mountain sides were bad enough, but worse was discovery that the heavy rooter would bog down in the sandy-like but fluffy volcanic-ash soil. And without rooting the thick top layer of sod would pile up so thick underneath the C-48 plow that the plow simply could not operate. Hours spent digging out the impacted sod every hundred feet or so ate up all the hoped-for advantages of plow operation. It looked bad for the plow enthusiasts.

At this point the ingenuity of the project engineer, Capt. John Irwin, peacetime engineer of the Pacific Telephone & Telegraph Co., saved the situation. Why, he thought, must a heavy rooter be dragged behind a tractor anyhow? Why couldn't the rooter tooth be mounted right on the front of the tractor itself? From idea to execution was a matter of only a few hours. The blade of a bulldozer was removed. A rooter tooth was welded into a yoke-like frame which in turn was bolted onto the bulldozer frame. The result is shown in the illustration on page 120.

The new tractor-rooter exceeded the dreams of its in-

"Swinging"—Alaska style. One hundred fifty men, spaced 10 ft. apart, "swing" long bight of cable into trench on steep mountain side.

No plowing here. Can you see the cable? Later it will be bedded and covered by Signal Corps men.

ventor. Not only did it operate easily in any place negotiable by a wide-track tractor, but the winch operation of the bulldozer frame gave a flexibility of depth setting and ease of removal of obstruction never before realized with rooter equipment. If a rock, stump, or other obstacle is encountered the tooth is raised and with it usually comes up the obstacle. If not, the obstruction can easily be dug out in front of the tractor. Or the tractor-rooter can back up and detour.

Solution of the rooting problem speeded up operation of the plow train to a rate equalling the best in commercial practice at home, and that in terrain which a line locator at home would scarcely consider. A great deal of the credit for the results belongs to the plow experts, Chauncey J. Wager and Ivan G. Fosbinder, who so skillfully trained the crew of soldiers in operation of the train. By an odd coincidence these gentlemen operated the same plow in Wyoming and Utah, and prepared it for shipment at Salt Lake City, little dreaming they would be called on to escort it to far-away Alaska.

Winding around mountains and skirting lakes and swamps, a surprisingly large percentage of routes have been found plowable. So long as the sod covering the volcanic ash is not torn up, heavy equipment can operate on it. A complete train of tractor-rooter, tractor, plow and cable trailer is usually the limit of what the sod will stand without being badly shredded. In one instance up a steep hill, a tractor stripped the sod and skidded down hill like a small avalanche. Only the operator's skillful handling brought it safely to the bottom. One mountain successfully traversed with the train is so steep that only four-wheel drive trucks and jeeps can climb to its top. The heavy Hyster winch tow line often pulled the train through swamps and mushy tundra.

In some congested areas a trench hoe or drag line has

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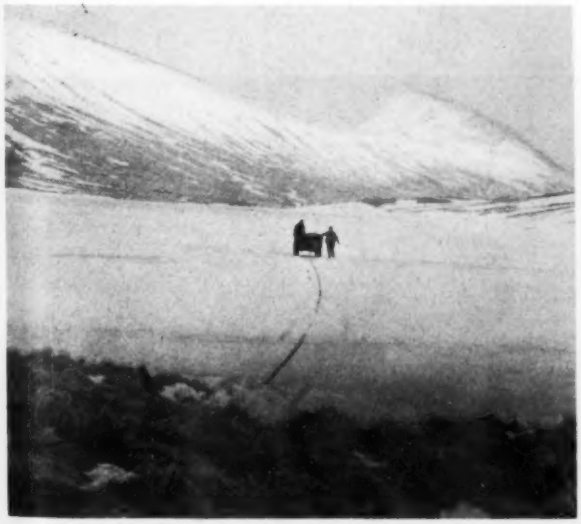


Skating Signal men lay subterranean cable on a frozen lake with aid of jeep to circumvent canyons and washes along shore line.

Sod piles up under plow, and train bogs down. Wide Athey tracks added locally when balloon tires gave insufficient bearing surface.

Step 1. REMOVING LEAD SHEATH FROM THE CABLE.

SIGNAL
Signal
CABLE
cable

Step 2. SPLICING THE CONDUCTORS.

Step 4. PLACING MUSLIN ENVELOPE FOR THE DESICCANT.

Step 3. THE CONDUCTORS ALL SPLICED AND LINED UP.

Step 5. APPLYING THE DRYING DESICCANT.

CORPS

Corps

LICING

Splicing

This series of nine pictures shows Cpl. Sam R. Marshall, of Company T, 15th Training Regiment, Fort Monmouth, N. J., giving a cable splicing demonstration during recent popular "Back the Attack" show given in Washington, D. C., in connection with the third war bond drive. No effort was made to write a long text for this series as it is believed this proves the old Chinese proverb that one picture is worth a thousand words. The impressive, skilled hands of Corporal Marshall tell a most convincing story without the need of further elucidation.

Step 7. PLACING LEAD SLEEVE OVER THE SPLICE.

Step 8. WIPING THE JOINT.

Step 6. WRAPPING MUSLIN BANDAGE TO BIND SPLICE.

Step 9. THE COMPLETED SPLICE.

Type of terrain over which line runs.

Typical muskeg bog which handicapped construction.

THE Alaska Highway Telephone Line

By Lt. Col. Ora F. Roberts

Communications Engineer,
Northwest Service Command
and
Assistant Engineer,
Alaska Communications System

This photograph of LT. COL. ORA F. ROBERTS, taken several years ago when he was a first lieutenant, was the only one available in time for this issue. He has been on active duty in the Great Northwest where providing essential military telephone communication took precedence over posing for a picture.

THE JUNE 5, 1943, issue of TELEPHONY gave a brief description of the Alcan Highway Telephone Line, now known as the Alaska Military Highway Telephone Line. The construction difficulties experienced in 50-degree-below-zero weather were outlined at that time. The following brief resume of the purpose of the line may be in part a repetition of the original article but is repeated for the purpose of making this article complete.

Early in March, 1942, the Chief Signal Officer of the Army voiced the need of a telephone line for military purposes to connect the United States with Alaska, and Gen. Frank E. Stoner, Chief of the Army Communications Service, directed that the necessary preliminary surveys be made. The first basic principle for the Signal Corps to meet in engineering this line was to enable a conversation originating in some extreme northern part of Alaska to any place in the United States to be satisfactorily completed. A hasty reference to a map of the region will indicate that for land line communication, this is quite a problem.

It was then decided that two physical circuits were to be built and each circuit to carry a "C" type three-channel carrier system, the two physical circuits to be composited for DC telegraph and one channel of one of the "C" carrier systems to be broken up into 12 voice frequency telegraph channels. The design of the pole line construction was to permit the use of the two "C" type carrier systems initially, with a possibility of changing over later to a "J" type, if the "J" type system were developed to the point where it could be used on a line of this length, namely, 2,000 miles.

"The necessity of conserving critical material such as copper, resulted in a decision to utilize .128 copperweld wire with 30 per cent conductivity in lieu of copper wire. Native timber was used for poles due to the fact that there appeared to be an adequate supply available, otherwise it

Section of line over typical terrain.

Typical camp of construction crews.

would have been necessary to haul poles by truck a distance of 1,000 to 2,000 miles. Approximately 72,000 poles of the No. 5 class were used and this would have resulted in a Herculean task as far as transportation was concerned.

The project was actually handled in three phases. The first phase was to complete a circuit from Edmonton to Dawson Creek and a deadline date had been set for this circuit to be activated by December 1, 1942. This was a mere distance of some 500 miles. In order to meet this date, AC operated V-1 repeaters were used and prefabricated buildings were erected. This work went forward in temperatures ranging from 20 degrees to 50 degrees below zero, while construction of the actual circuit proceeded in the same temperatures and in snow drifts 5 feet to 6 feet deep.

The second phase of the line was the completion of the installation from Edmonton to Whitehorse and the activation of the carrier systems. This involved the completion of 15 repeater stations. The weight of equipment for each station averaged approximately 40 tons, all of which it was necessary to transport by truck over 1,000 miles of frozen road. The date of May 15, 1943, had been set by Gen. Frank E. Stoner, Chief of the Army Communications Service, for the activation of the system into Whitehorse and it was necessary to rush men and material into the various stations so that when the spring thaws and the ice in the rivers began to break up, men and material would be at the locations as it was not possible to haul by truck during the break-up.

The installation of the repeater equipment was accomplished by Western Electric Co. personnel, who under somewhat primitive conditions as far as housing and food were concerned, did excellent work. The fact that most of the above work was performed in sub-zero temperatures was outlined in the former article mentioned above.

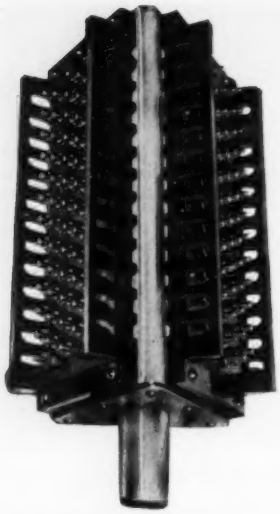
The third and final phase of the project was the construction from Whitehorse to Fairbanks. The accompanying pictures give some indication of the type of terrain over which it was necessary to construct the telephone line. In the third phase of the project we were fortunate in not having the extreme cold weather, and speed being essential throughout the entire project, it was often found that the construction crews were right behind the staking crews.

During the spring and summer, streams which are normally narrow and easily forded, changed almost overnight to a mile wide and in some cases two miles wide and a raging torrent 10 feet deep, flood control being unknown in the north country. Then our famous muskeg while

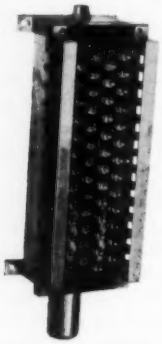
(Please turn to page 60)

What can happen to a tractor in muskeg.

Method of wire stringing.

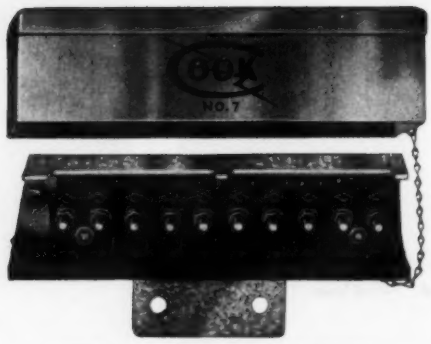


THE UNIFLEX CABLE TERMINAL
Signal Corps. No. 5C-2451



TYPE M16 CABLE TERMINAL
Signal Corps No. 5C-551M

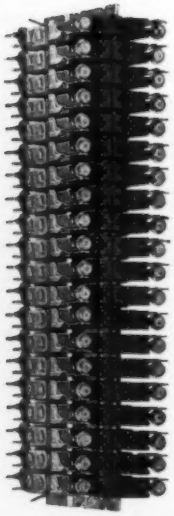
TYPE S6 CABLE TERMINAL (PROTECTED)
Signal Corps No. 5C-3026



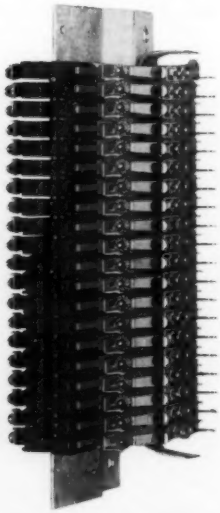
TYPE 7 HIGH POTENTIAL LIGHTNING ARRESTER
Outdoor Pole Type Arrester
Signal Corps No. 5C-2200

TYPE 07 SUB-STATION PROTECTOR
Single Circuit Protector for both Indoor and Outdoor Use
Signal Corps No. 4E-4006

TYPE UX CABLE TERMINAL
For Termination and Distribution of Underground Systems
Signal Corps No. 5C-3030

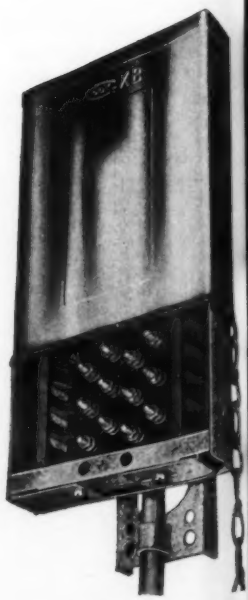


TYPE NO. 100 CENTRAL OFFICE PROTECTOR
Signal Corps No. 4E-4434



TYPE NO. 3800 CENTRAL OFFICE PROTECTOR
Signal Corps No. 3C-408

POLE JACKS
Compact and Weatherproof
Signal Corps No. 4B-1601



TYPE XB CABLE TERMINAL
Signal Corps No. 5C-2710

ARMY E NAVY

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Here are a few Cook standard products used by the independent telephone industry and the Signal Corps.

This is the type of Cook equipment that has served the telephone industry faithfully for nearly half a century, and is now serving our armed forces in a job where performance must be assured.

While meeting the great production demands of the Signal Corps in a manner which has merited the Army-Navy "E" Award for war production excellence, we have also maintained our obligation to the telephone industry by meeting their requirements for Cook equipment. We are proud of our record in meeting this double responsibility.

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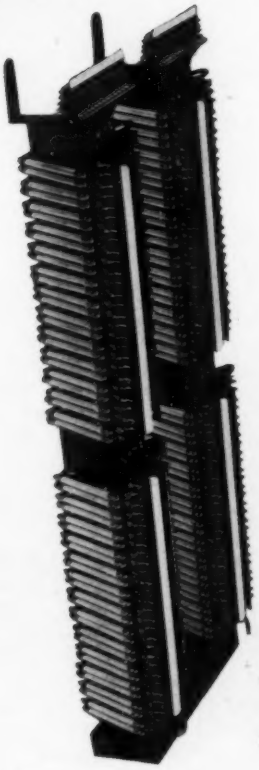
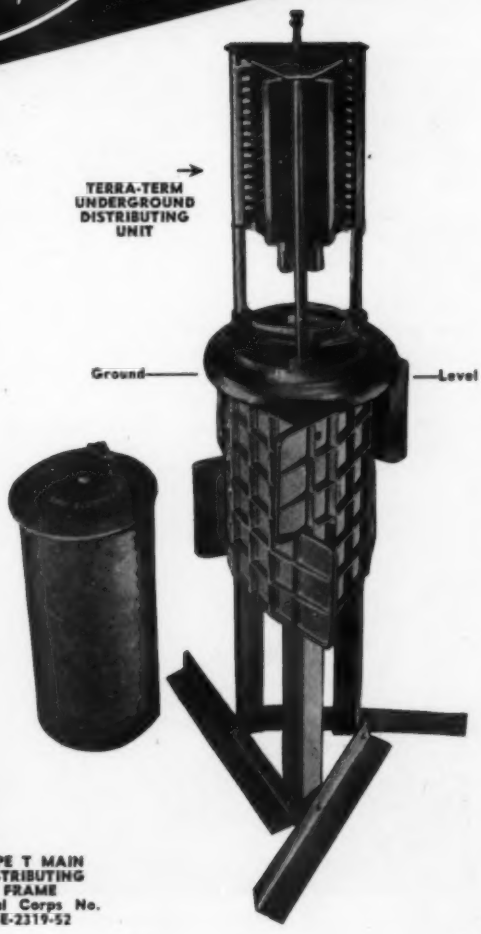
GROOVED CARBONS Signal Corps No. 4E-683

TRU-GAP DISCHARGER Signal Corps No. 4E-682

TYPE H-20-9 PROTECTOR UNIT Signal Corps No. FTN-26938



TYPE T MAIN DISTRIBUTING FRAME Signal Corps No. 4E-2319-52



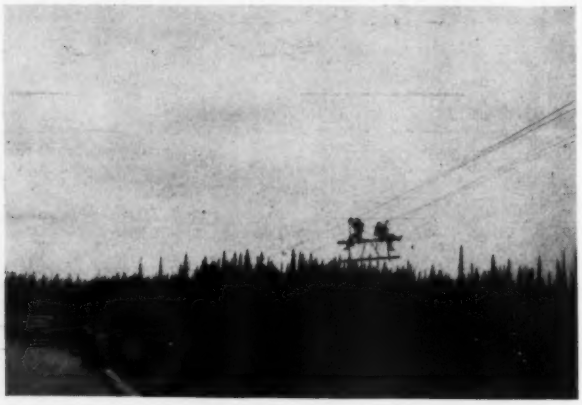
Maintenance difficulties on the line.

frozen in winter could be travelled over, but could not even be walked on in the summer months. Honorable mention must be given to the famous northern mosquitoes and the tallest tale about them in the north country would make Paul Bunyan appear an amateur.

Then also there are the no-see-ums, a little gnat-like bug which somehow seems to get through the headnet and do an excellent job of biting. No-see-ums usually quiet down after dark, but mosquitoes do not. It should be remembered that during the months of May, June, July and part of August there are from 18 to 23 hours of daylight in these sections. Mosquitoes often congregated so thick on a man's clothing that one could brush them off by handfuls. The housing situation was somewhat relieved due to the milder weather.

Long spans and catenary construction were used over all streams and wide gullies. It was originally planned to use submarine cable at the river crossings, but after watching the ice go out of the rivers and large ice cakes dive and scrape the bottom, it was decided that submarine cable was impractical.

It was also necessary during the third phase of the project to construct an additional circuit for pipeline control for what will, in all likelihood, be one of the largest, if not the most northern, pipeline system in the world. Muskeg fixtures were designed and these have proved to be very satisfactory. In some cases it was possible to build river crossings by installing side arms on bridges, but, in most cases, it was necessary to construct the line across the rivers before the bridges were built. In some cases temporary crossings were used. Where perpetual frost was experienced, steam nozzles were used to thaw the ground to dig the post holes. This was done by mounting a small steam boiler on a truck and with lengths of hose long enough to reach from the safe parking place for the truck, thaw the ground and dig a hole in the good old-fashioned way.



Catenary river crossing.

Considerable thought was given to frost heaves which in the north country are known to push poles out of the ground. In these areas three small saplings were laid vertically against the pole from the bottom of the hole to about 12 inches above the ground before the pole was backfilled and tamped, the idea of this being that the frost heave will grip the sapling and push the sapling up, while the pole would remain in the ground. While this may be open to question, to date it has proved satisfactory.

There was also the matter of some 500 tons of repeater equipment to be delivered to the seven repeater stations of the second phase of the project. This was coordinated with the various government agencies involved and was divided into two shipments and escorted by Capt. Joseph J. Smetana, Army Communications Service, and a representative of the Western Electric Co. whose responsibility it was to see that in each case the correct and complete shipments were delivered at the designated repeater station. These shipments involved railroads, boats, and trucks with at least three trans-shipping points for each lot. For military reasons, it is obvious that the names of places and routes cannot be given.

Pipe line control circuit.

Another serious problem was the matter of transporting some 60 installers, furnished by C. G. Stoll, president, Western Electric Co., out on the job and housing and feeding. There was also a stretch of some 40 miles of muskeg where the permanent pole line construction was delayed while road gangs built the road through this area. To meet the activation date, it was necessary to string twisted pair for each wire, a distance of about 30 miles. The accompanying illustrations indicate the hoar frost experienced in the north country in early September.

The installation of repeater equipment at one station was delayed because of road conditions and the fact that a building was constructed and repeater equipment installed complete and ready for testing in 30 days, is a matter of note. This action was necessary to meet the deadline date which we had set for October 15, 1943.

Despite all difficulties, the line was officially opened on October 15, 1943, when a call was made from Fairbanks, Alaska, to Gen. Frank E. Stoner, Chief of the Army Communications Service, Office of the Chief Signal Officer in Washington, D. C., and Col. Will V. Parker of the Plant Engineering Agency in Philadelphia. Now, the maintenance problems begin, but due to careful engineering and construction, it is not expected that they will be serious.

ANOTHER ESSENTIAL INDUSTRY SERVED BEST BY FWD TRUCKS

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Here is another instance of FWD's leadership in a basically important field of motor truck service. Wherever there is important work to be done, FWD trucks are always in evidence.

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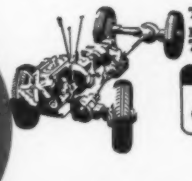

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Plant Engineering Agency

By Col. Will V. Parker

Born at Graham, Tex. He was commissioned a first lieutenant in the Signal Corps reserve on January 21, 1918. Promoted to captain, February, 1919; to captain in the Signal Corps Regular Army July, 1920; to major June, 1939; to lieutenant colonel (temporary) April, 1941; to lieutenant colonel (permanent) October, 1941; and colonel (temporary) February 1, 1942. On duty in Office of the Chief Signal Officer, American Expeditionary Forces, U. S. Headquarters Services of Supply at Tours, France. Returned to U. S. September, 1919. On February 1, 1943, he was made director, Plant Engineering Agency. Received the Silver Star for gallantry in action and the Purple Heart for his services with the Signal Corps during the last World War.

THE Plant Engineering Agency of the Signal Corps is a field agency reporting to the Chief Signal Officer through the Army Communications Service. Our headquarters are located in the Architects Building in Philadelphia, Pa. If you will picture in your mind the services rendered to the American public within the continental limits of the United States by the Bell Telephone System, the telegraph and cable companies and the radio networks, you will have a picture of the services Plant Engineering Agency renders for the United States Army all over the world.

We perform the detailed engineering on the installation of Army fixed communications, both wire and radio, for the Army Ground Forces, and the engineering and installation of the airways communication and meteorological services for the Army Air Forces. In addition to the actual communication circuits designed and provided by our engineers, it is necessary that we also provide for power supply to operate the equipment where commercial power is not available or when its continuity of supply is not assured. These power installations may vary in size from small portable types to as much as 300 kilowatt installations.

In order to facilitate the full discharge of the Plant Engineering Agency's responsibilities for the supervision of installations in the field, the globe has been divided into four sectors, with headquarters at Presque Isle, Me., for the northeast sector; Miami, Fla., for the southeast sector; Seattle, Wash., for the northwest sector, and Honolulu for the southwest sector.

Many of our problems are common with those experienced by commercial communication organizations. But the majority of the requirements placed on us are necessitated by military operations in theaters of war, and this of course, presents complicated problems involving engineering, procurement and installation. Victory or defeat, or failure of operations of supply, is often determined by the communication facilities available, and the cost of inadequate facilities may be measured in lives lost. It becomes our responsibility, therefore, to make sure that wire or radio channels are available where needed and when needed, irrespective of the obstacles and difficulties encountered.

The difficulty of obtaining sufficient materials and obtaining them on time, no doubt, are conditions which many of you face in your daily work. We, too, have those difficulties and they cause us many hours of anxiety and concern. Because of the importance of the time element in our work, it is necessary that we anticipate our requirements early, wisely, and accurately, and that we follow through on each phase of our operations with every ounce of our energy. I should like to say that the results we have obtained thus far are due in no small part to the cooperation we have generally received from the industries and defense plants on whom we depend for manufacture and supply of our equipment. Their problems become our problems and it is necessary that we work closely with them both in design and development and production.

Since Pearl Harbor, the Plant Engineering Agency has grown from an organization of a few officers and civilian employes to thousends, and we have put thousands of communication projects into operation. From the vast activities of the Army in communications, developments have accrued that in the future will be of real benefit to the communication industry. These developments and projects, in many cases, are of a secret or confidential nature and therefore cannot be discussed.

However, to give you an idea of the extent of our operations since Pearl Harbor, the total amount of wire communication circuit constructed for the use of the United States Army would go many times around the earth. The number of radio communications installed for the Army in the past 15 months, is more than all the radio communications in the entire world before December 7, 1941.

When one hears of any Army communications system that is operating in territory once held by the enemy, he may not realize the great amount of work that was required for its completion. Let me review briefly some of the factors and operations involved from its inception, and then let me follow its progress with you.

First, offense plans are worked out by our War Department Planning Division. They determine what territory is to be occupied; how it is to be occupied; the size and kind of task force required; the supplies and equipment needed; whether amphibious landings are to be made, and if so the number and types of ships that will be necessary. All these and many more problems must be decided upon and planned in detail.

As one branch of the Army service forces the Signal Corps has to plan the necessary ship-to-ship and ship-to-shore communications required; what mobile and tactical communications are needed; and then what fixed communications will be necessary when the territory is won. This latter problem is our job. Army intelligence supplies us all available information as to the existing communication facilities of the territory to be occupied. This information is used in planning for fixed communication equipment.

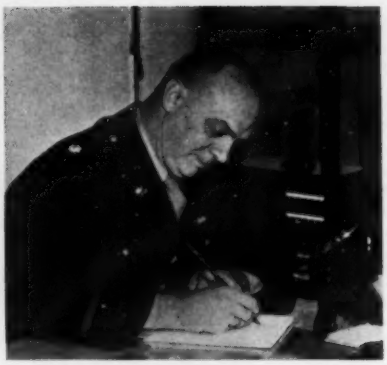
When the plan has been approved, the fixed communications are assigned to us for completion and it is known as a project and given a number that ties in with the overall general plans. Our organization does not have any information as to the general plan. We only know this work as a project. Our engineers draw plans and specifications and wherever possible use standard equipment so that it will be interchangeable with that used on other similar projects.

After all engineering has been completed, then procurement is started for the items which are not available in Signal Corps depots. The projects require telephone, teletype, telegraph, and radio equipment, and all the pole line

(Please turn to page 66)

LEICH *manufacturers of telephones, switchboards and related apparatus since 1907*

COL. WILL V. PARKER, Director, Plant Engineering Agency.



MAJ. H. B. GARVEY, Executive Officer, Plant Engineering Agency.

MAJ. W. H. WOOD, Chief Administrative Branch, Plant Engineering Agency.

and construction materials used in commercial systems. Because of the wide variety of equipment required and the many sources of supply that must be contacted, the procurement job is one which requires careful planning, coordination, and scheduling. Speed in procurement of equipment is essential and, as I mentioned before, failure to obtain the necessary parts might seriously affect plans and the successful completion of them.

Our procurement responsibility is the initiation of purchases and requisitions and the following of these to assure coordination between the various manufacturers and the assembly of the proper items of material at destinations. A single project oftentimes includes thousands of boxes and parcels and these may come to an assembly point from many different locations, and by various means of transportation. This makes it imperative that each such shipment be checked out of the factory and into the receiving point.

Timing of shipments is necessary to relieve all possible congestion at assembly points, and frequently a few hours' difference in arrival of equipment would disrupt the entire movement of the project. In order to reduce all possible misrouting or delays in shipments, we must send officers to ports of embarkation or other assembly points to check materials as they arrive and see that they are actually loaded for shipment to their ultimate destination.

When the equipment for these projects arrives at its ultimate destination, it is met by Signal Corps personnel who will make the respective installations and put the various communication channels into operating condition. In the

Officers in the Wire Section, Engineering Branch, Plant Engineering Agency. (L. to R.) MAJ. C. E. WARD, MAJ. JOHN THORPE, CAPT. R. H. FESTNER, CAPT. RALPH DAYTON, CAPT. H. C. HARRIS and LT. W. H. WELCH; all formerly with various Bell companies.

case of airways communications systems and meteorological services for the Army Air Forces, installation teams of our organization make these installations. These teams of enlisted men are activated and trained at our plant assembly center, at Brookline, in Philadelphia where they learn to assemble the actual equipment they will later receive in the various sectors. They are trained in teams, consisting of from eight to 20 men and one or more officers. The individuals are all specialists in certain equipments, but are all given general training in installation work.

It must be admitted that this presents a rather broad picture of the job of the Plant Engineering Agency. I wish to pay especial tribute to the accomplishments of engineers assigned to this agency. These men came to us from both the small and large communication companies and power companies and industrial plants unselfishly offering their services. In leaving the commercial companies, they left jobs which had to be carried on under the increased tempo of war. These extra duties fell to men left on the job whose duty it is to keep communications operating in such a manner as to permit the war effort to proceed full speed ahead.

When our victory is won and the history can be written of the important part played by communication, I am sure that we will all be proud of the accomplishments of all engineers, whether military or civilian.

V V

A Recruit Always Finds an Answer

The old signal sergeant ordered a new recruit to clean up some water from the floor in front of the storage battery cabinet in a cantonment-type telephone exchange. The sergeant came back a few minutes later and found that the water had disappeared through a ⅝-inch hole the new man had bored through the wood floor. The sergeant then spoke and the recruit wondered why he ever joined the army.

V V

Depot Commanders Meet

A conference of Signal Corps depot commanders, attended by Maj. Gen. H. C. Ingles, Chief Signal Officer, recently was held in Chicago to discuss current supply problems and future requirements and to insure a continuous flow of Signal Corps equipment to overseas theaters and domestic installations. Maj. Gen. William H. Harrison, chief of the Procurement and Distribution Division, Office of the Chief Signal Officer, presided at the conference.

V V

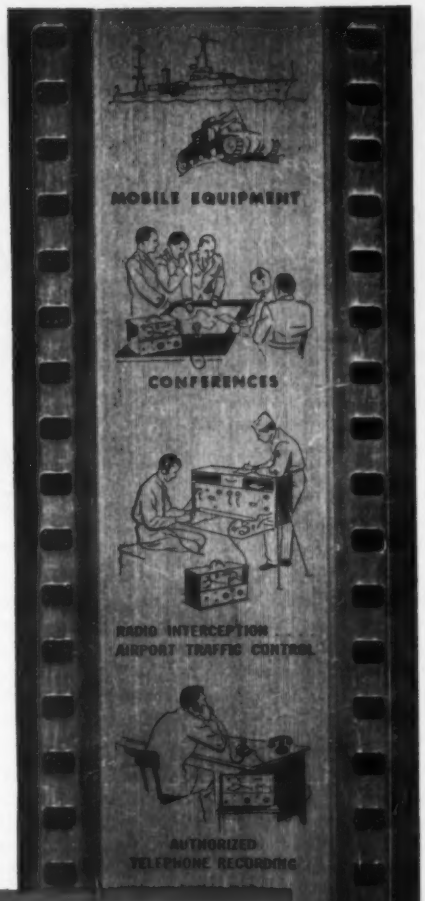
McIntyre Presents "E" Pennant

Lt. Col. Charles J. McIntyre, chief, Special Activities Branch, Office of the Chief Signal Officer, recently made the presentation speech awarding the Army-Navy "E" pennant to the employes of the Amperex Electronics Products Co., Brooklyn, N. Y., manufacturers of radio tubes. Colonel McIntyre complimented the employes on their production efforts and urged them to maintain or surpass their excellent records.

GRAPH

Designed especially for government use, the new COMMANDO MODEL RECORDGRAPH provides many features *exclusive* in the recording art. Extremely compact yet entirely self-contained ...actuated directly or remotely by electrical impulses or voice or sound . . . providing for 5 continuous hours of recording or playing without media change . . . designed and constructed to withstand vibration and shock and to operate in any position ...and permitting instant location and playback of any portion of a recording, it affords convenience, efficiency and broad utility heretofore unapproached.

Other Models of the Recordgraph with design and operating features equally outstanding, are available for *all* portable and stationary sound recording requirements. Your request will bring complete information.



Outstanding Features of the "*Commando*" RECORDGRAPH

- Playing time unequalled . . . 5 hours continuous without changing media, many more hours of intermittent recording.
- Instant location and immediate play-back of any portion of recording. No processing required.
- Provides a *permanent* record, which cannot be erased, on everlasting Amertape.
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- Four in-put circuits . . . Microphone, Radio, Line Tap, Carbon Mike; output circuits . . . Monitoring, External Speaker.

The Commando Model is supplied in this compact, durable traveling case.

- Every control in convenient, front position.
- Records in any position, side, back or upside down; undamaged by shocks or vibration.
- Starting and stopping controlled by manual switch, or remote foot switch, electrical impulse, voice or sound.

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Signal Corps Procurement

By Col. Eugene V. Elder

Born in Arkansas in 1895. Entered service with Kentucky National Guard in 1917. Commissioned a second lieutenant in the Signal Corps of the Regular Army in 1920 and promoted to first lieutenant same year; to captain in 1934; to major in 1940; to lieutenant colonel (temporary) in 1941; to colonel (temporary) in 1942. Has held numerous posts including duty in Hawaii. He was assigned to the Office of the Chief Signal Officer at Washington, D. C., in 1936 where he served in various capacities until August of this year when he was appointed officer-in-charge, Philadelphia Procurement District.

TO A GREAT many people not directly connected with Signal Corps procurement, the purchasing activities of the Philadelphia Signal Corps Procurement District may appear complicated and bewildering. This is a natural feeling, since to meet the communications requirements of the largest Army ever assembled, a large-scale and complex organization cannot be avoided.

A tremendous volume of work must be turned out to meet procurement schedules for which funds have been appropriated. In order to keep abreast, the Philadelphia Signal Corps Procurement District must purchase material at the rate of approximately $5,500,000 a day. Congress has appropriated for the fiscal year 1944 more than $74,000,000,000 for the prosecution of the war, of which the Signal Corps has been allotted approximately $4,500,000,000.

Consider the significance of that last figure in the light of what we have been familiar with before the war. In peacetime, the Philadelphia Signal Corps Procurement District spent approximately $2,000,000 a year, whereas today, in the same district, a single contract for that sum is a common occurrence. As recently as 1939, the procurement district, consisting of one officer and 14 civilians, purchased and inspected during the year, $4,500,000 worth of equipment on approximately 2,400 contracts and orders.

At the end of the last fiscal year in June, 1943, the procurement district had placed approximately 44,000 contracts and orders for more than $1,500,000,000 worth of equipment. In peacetime not even the largest corporation in the United States or in the entire world ever purchased in one year a quantity of materials equal to that which the Philadelphia Signal Corps Procurement District now is procuring annually.

What kind of procedure is set up to procure such a vast supply of communications equipment? It is one by which a contract for $14,000,000 can be placed with the same ease as an order for $1,400, and by which delays are reduced to an absolute minimum through a timing system which makes it possible for a contemplated purchase to emerge as a contract within 20 days.

Time is allotted to various operations as follows: one day, after the receipt of procurement instructions, to get the quotation request into the hands of prospective bidders; 12 days for bids to be received; three days for the preparation of a purchase memorandum covering all the important and pertinent contractual clauses to be incorporated into a contract; and four days for the contract to be written and mailed to the contractor. Thus, although each day sees a volume of purchases in any one of these stages, a daily average of 150 completed purchase orders and contracts is maintained.

Every step in the procurement process has been carefully systematized. A purchase plan is received in the Philadelphia Signal Corps Procurement District from the Office of the Chief Signal Officer in Washington, indicating the required item, quantity, and delivery to be met. This plan is routed through the Fiscal Section for recording of estimated costs against the account charged, and thence to the Procurement Engineering Branch where it is broken down into component parts, and a quotation request form prepared. The plan is then forwarded to one of four commodity sections, each specializing in the procurement of a particular type of communication equipment, their names indicating the classification of the material handled. These are the Radio Section, the Wire and Cable Section, the Telephone Section, and the Miscellaneous Section.

The commodity section then sends quotation requests with blueprints and specifications to a list of potential bidders, and on the date specified, the price is negotiated under the authority of the First War Powers Act of 1941. The award decided upon, a purchase memorandum is prepared and all papers are forwarded to the Contract Section, which proceeds to prepare a contract or purchase order. Of course, this brief summary cannot give all the many details, legal aspects, recordings, and, as happens frequently, ultimate renegotiations for reduction in prices to avoid excessive profits.

The inspection of material purchased by the Philadelphia Signal Corps Procurement District is made by inspection zones located in Philadelphia, Newark, Chicago, Dayton, and San Francisco. When material is inspected and accepted, acceptance and shipment reports are submitted to the finance officer designated in the contract. The contractor sends his invoices to the finance officer, who sends him a check to cover the cost of material which has been delivered to and accepted by the government.

Just what does this procurement district purchase? The answer is even more diverse and detailed than the Signal Corps catalog, for this district handles a large percentage of the approximately 70,000 Signal Corps items, many of which are so new that they have not yet been cataloged. On one purchase plan, there is often enough wire purchased to encircle the globe 20 times. Radio receivers and transmitters used on the ground and in tanks, complicated frequency meter sets, and switchboards may be bought during the same day as beeswax compound, publications, and a myriad of other miscellaneous items.

The vacuum tubes which are purchased range in size from the smallest now made, to giants which may cost as much as milady's fur coat. The pigeons which fly over battle areas carrying important messages strapped to their legs—when radio communication cannot be used without divulging locations—are not forgotten. For them the district purchases quantities of pigeon feed, even as much as one thousand tons, scientifically concocted of kaffir, New

Portion of Procurement District's general offices.

Tabulating room of Philadelphia Procurement District.

Zealand or Tasmanian peas, millet seeds, vetch, and wheat —this melange being packed in fumigated and hermetically-sealed containers.

Pigeon drinking fountains and glass eggs (PG-40) for the pigeon's ultimate contentment are also procured. This nomenclature PG-40 is not to be confused with the P-40 fighter bomber which carries "eggs" for an entirely different purpose.

The actual placing of contracts is only one phase of the procurement district's activities. Another highly important one is its encouragement of contractors to participate fully in the development of American communications. For example, many films have been given experimental and educational contracts to enable them to study and meet the exacting requirements of Signal Corps specifications for such materials as field wire, field telephones, and radio equipment. Out of this foresighted program has come vastly increased production. Field wire and telephones produced as a result of such contracts have been widely used on the Russian front, and have been accompanied even by instruction books and circuit diagrams printed in text. Other communications equipment so produced played an important part in the air attack which destroyed the German dams.

Small war plants are given every opportunity for maximum participation. This policy not only results in a fair distribution of contracts and increased production, but it also conserves the resources of larger concerns, which have the engineering, managerial, and physical facilities required to deal with the more difficult problems. In this way, resources of each plant are used most advantageously, and producers are encouraged to operate at the highest attainable efficiency, with a minimum of waste and misuse of materials and labor.

In order to assist contractors in fulfilling their contractual obligations, advance payments on contracts may be made, upon the contractor's request, in cases where such action will facilitate the prosecution of the war. This assistance has been found to be of great value in keeping plants in uninterrupted production. One contractor who received such aid wrote in part as follows:

". . . having successfully passed through the critical period of our existence with the sympathetic and able guidance of your organization, we are taking this opportunity of expressing our gratitude."

Rendering such assistance as this has enabled the procurement district to secure the fullest cooperation of contractors in expediting deliveries to meet new schedules.

Still another phase of the procurement district's activities is the fulfillment of its obligations to the American public and the promulgation of American ideals. To insure that no excessive profits are made on war contracts, all contracts contain a renegotiation clause, which permits representatives of the district to examine contractors' profits and renegotiate where necessary.

Many companies have more than cooperated in the observation of this provision, voluntarily returning large sums to the government as soon as they themselves definitely determined that excessive profits would accrue. All contracts also specify, in conformance with our democratic principles, that contractors, in performing their contractual obligations, shall not discriminate against any employe or applicant for employment because of race, creed, color, or national origin.

Contracts over $10,000 include the provisions of the Walsh-Healy Act, which protects all employes engaged in the performance of the contract in regard to minimum wages, hours of employment, minimum ages of male and female employes, and working conditions.

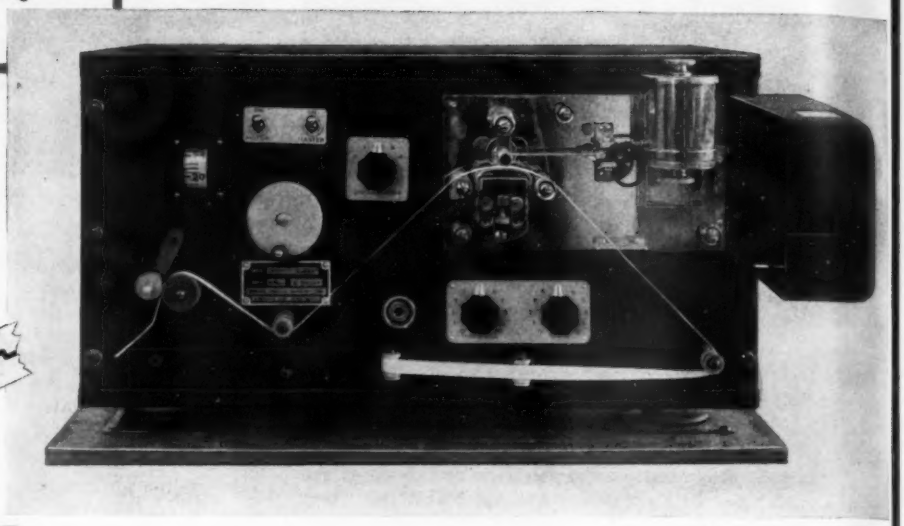
The Philadelphia Signal Corps Procurement District is carrying on the traditions of the Signal Corps—efficiency, fair play, and faith in American ideals. Although hundreds of millions of dollars must continue to be spent, there are no hysterics, and to the passing observer nothing unusual seems to be happening. That is because the district is aware of its responsibilities and confident of accomplishing its aims.

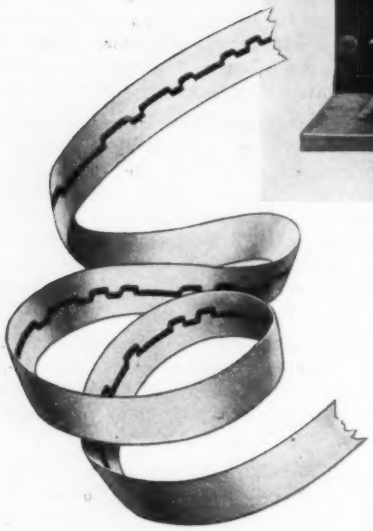
THE SIGNAL CORPS

GETS THE

MESSAGE THROUGH

Serving the





INK RECORDER

For receiving radio and wire messages at EXTREMELY HIGH SPEED

Today, many messages are flashed at such high speed that no human being can receive or transcribe them directly. This machine takes such messages, and by the magic of electronics, records them with quick-drying ink on a paper tape. The messages can then be read or copied. It also has the advantage of providing a permanent record, and obviates the factor of human error.

Provided with three pens: *light*, for extremely high speed recording (over 500 words per minute); *medium*, for general purpose; *heavy*, for recordings to be played back on the automatic keyers.

These recorders are now in production for the Army.

Have you an idea or invention in electro-mechanics

which you think will aid the war effort, or which has peacetime application? We'll be glad to develop it with you on a mutually satisfactory basis.

We are planning to add 5 or 6 products to our post-war line. If you have a product or idea which you believe would fit in with our activities, write Mr. W. E. Ditmars, our President, in complete detail. We will consider any practical arrangement.

GRAY

Makers of telephone pay stations since 1891

★ ★ ★

Training the Signalman

By Brig. Gen. G. L. Van Deusen

Born in New Jersey in 1888. Graduated from West Point in June, 1909. Promoted to first lieutenant November, 1912; captain May, 1917; lieutenant colonel (temporary) October, 1918; reverted to permanent rank of captain August, 1919; promoted to major July, 1920; to lieutenant colonel October, 1934; to colonel October, 1938; to brigadier general (temporary) April, 1941. Served with Coast Artillery until 1917 when he was assigned to command 105th Signal Battalion. Sailed to France with 30th Division in 1918. On return, was assigned to the Chief Signal Office. He has been on duty at Fort Monmouth, New Jersey or the Chief Signal Office practically ever since. Since October, 1942, he has been commanding General of Signal Corps Training Center, Ft. Monmouth.

SINCE Pearl Harbor, the mission of the United States Army Signal Corps has achieved popular notoriety both in and out of the Service. The familiar phrase, "Get the Message Through," has been publicized through radio programs, recruiting drives, billboard advertisements and various other media of public appeal. In response to these appeals and through Selective Service, thousands of men eager to pursue communications training have requested duty with the Signal Corps. The Eastern Signal Corps Training Center located at Fort Monmouth near Red Bank, N. J., is charged with training a portion of these inductees to become specialists in just that vital war need—getting the message through—when success or failure in battle depends upon speedy and efficient communication.

Through the two large subdivisions of Fort Monmouth, the Eastern Signal Corps Schools and the Eastern Signal Corps Unit Training Center (formerly the Replacement Training Center), have passed literally thousands of trained officers and men, each a qualified specialist in some phase of signal work.

These graduates were in the landings in North Africa, fought from the foxholes of Bataan, dispossessed the Japanese on Attu, struggled for and conquered Sicily and Southern Italy, and even at this moment are fighting through the steaming jungles of the Southwest Pacific and maintaining watch on the frigid slopes of Iceland. However, battle efficiency is not easily attained. Every Signal Corps soldier must receive both basic and specialist training before joining a field unit for eventual overseas duty.

In addition to performing as a signal specialist, Signal Corps training operates on the assumption that a soldier must know how to defend himself and his equipment from surprise attack by small enemy ground and air forays. Therefore, each new arrival at Fort Monmouth is interviewed for potential ability as a Signal Corps specialist and as a hardy physical specimen who can endure the rigors of war.

He is selected to take any one of a dozen courses taught in the Eastern Signal Corps School. Depending upon the technical nature of the course, he can expect to attend classes for from four to nine months every week-day, and may graduate as a cable splicer, repeaterman, installer—repairman (common or local battery), powerman, radio-repairman, switchboard installer, teletypewriter repairman, wire chief, central office repairman, pole lineman, radio operator, crypto-analytic clerk or as a skilled workman on numerous other late types of telephonic and radio equipment.

The Eastern Signal Corps School has adopted the extensive use of visual aids and training films in teaching these complicated specialties in the shortest period of time.

The battle over, an exultant soldier runs to investigate a prostrate Nazi, prepared to deal a wicked "butt-stroke" in case he makes any movement.

Two soldiers pause in front of the deserted stores. One man has spotted the concealed camera, which might well have been an enemy sniper.

The Signal Corps moves up under fire in training at the Allaire Combat Course. These communication men are taught to conduct themselves as infantrymen, as they quite often will be their own infantry in the field.

By employing charts, electrical devices, reduced scale murals of terrain, sand tables and miniature equipment, the signalman gets a foretaste of operation and maintenance of equipment under simulated combat conditions.

The radio operator is allowed to practice on actual sets with the same type set he will use in the field unit. The pole line teams are required to string wire through all the natural obstacles of adjacent forests as well as erect first-class field wire and cable circuits on ordinary 35-foot poles. Modern maintenance trucks, equipped with power-driven post hole diggers, require less time, labor and personnel. Compare this technical training with the simplified methods of communication of World War I.

Officers, too, are given comprehensive training in a special school to prepare them physically and practically for command or combat and troop duty. They receive accelerated basic and combat training as well as specialist training in radio, telephone, field wire, motor transport, administration and supply, and the operation of message centers.

The Unit Training Center at Camp Wood is responsible for the field preparation of cellular signal teams while various types of signal companies are trained at Camp Edison. These units train and perform as a group from start to finish and are activated to perform essential Signal Corps functions in large Army Centers.

Technical instruction is carried on for one-half of the soldier's day with the balance of his duty hours devoted to basic field training. It is this tactical knowledge of how to fight and what to expect in modern combat that rounds out our original inductee into a soldier-communications man.

He is physically hardened through cross country running, obstacle courses (i.e. a series of hurdles, barriers and hazards designed to force the soldier to creep, crawl, and jump), calisthenics, and long hikes with full pack.

Again, using visual aids and training films, the signalman is taught military sanitation, malaria control, jungle warfare, defense against chemical attack, courtesies and customs of the service, first aid, sex and personal hygiene,

(Please turn to page 108)

Trainee operating field switchboard.

Operating radio with hand generator.

WHAT'S THE DIFFERENCE BETWEEN TRANSITE *CONDUIT* and TRANSITE *KORDUCT*?

TRANSITE KORDUCT
is ideal for locations where ducts must be "concreted in." It is identical with Transite Conduit, except that it is thinner walled and lower priced. It saves at installation because . . .
its long lengths cut down on joints, reduce the number of spacers required. And its high rate of heat dissipation cuts cable operating temperatures . . . increases system capacity.

TRANSITE CONDUIT
is for use underground or on exposed locations without a concrete casing. It can't rust or rot . . . resists weather and corrosion . . . remains unaffected by smoke or ordinary fumes . . .
Its uniform strength and durability mean that it holds its true form under earth loads and traffic pressure. And it is low in cost . . . more economical in service than other materials of comparable strength and corrosion-resistance.

And here are characteristics that Transite Conduit and Transite Korduct have in common . . .

1. Incombustible . . . Made of asbestos and cement, Transite Ducts won't contribute to the formation of dangerous smoke, gases or fumes. When burnouts occur, they give maximum protection to adjacent cables and equipment.

2. Immune to Electrolysis . . . Transite Ducts are entirely inorganic, non-metallic, cannot be affected by electrolysis.

3. Smooth bore . . . Cable pulls and replacements are easier . . . damage to sheathings is minimized.

4. Easily installed . . . Their combination of light weight, long lengths and quickly assembled couplings speeds up work.

For details and specifications, write for Data Book DS-410. Address Johns-Manville, 22 East 40th Street, New York 16, N. Y.

Johns-Manville

TRANSITE DUCTS

TRANSITE KORDUCT— for installation in concrete

TRANSITE CONDUIT— for exposed work and installation underground without a concrete encasement

Interior of an early prefabricated cable office.

ENGINEERING HISTORY OF THE SIGNAL CORPS

By Ray Blain

Chief Engineer of the Wire Section, Engineering Branch of the Plant Engineering Agency, Office of the Chief Signal Officer, in Philadelphia, Pa. Born December 31, 1893, in Kirkman, Iowa. Associated continuously with the operating telephone industry since January 1913, first with the Southwestern Bell Telephone Co. in Oklahoma, and later with the Northwestern Bell at Des Moines, Ia. Entered the Signal Corps as a sergeant, first class in 1918 and after the war remained in the Corps as a civilian engineer. Served in various sections of the continental United States and the Philippines. Has been a consistent contributor to various publications since 1926.

"I HAVE seen the Signal Corps expand from only a small force of Morse telegraphers and wig-waggers to a great scientific organization. I have seen large Army posts without a single telephone. I have seen a commanding officer at Fort Monroe, Va., proceed in quick time from his living quarters to post headquarters, approximately one-fourth mile, to answer a call on the only commercial telephone on the post.

"I have lived to see, during my span of service, the Signal Corps communication grow to such a degree of perfection that a telephone is now placed on practically every desk in most Army offices. At the present time, even subordinate officers such as lieutenants, have a stenographer to answer their telephone calls."

This statement is made by Walter R. Taylor, who is recognized as the dean of all civilian Signal Corps telephone engineers. Having served the Army more than 50 years and, having reached the age of 70, he will retire from active service in February, 1944.

The life and service of Mr. Taylor is a most interesting story. Born in North Carolina in February, 1874, he enlisted in the Artillery at Fort Monroe in January, 1894. He left for Puerto Rico when war was declared with Spain and was the non-commissioned officer of a detachment of men at Fort San Christobal that fired the Jubilee guns on October 18, 1898, in celebration of the raising of the Stars and Stripes at San Juan, capital of Puerto Rico.

Mr. Taylor returned to the United States and re-enlisted in the Signal Corps in April, 1899, at Fort Myer, Va., was detailed on special duty in the Office of the Chief Signal Officer in Washington, D. C. and assigned to duty in the Signal Corps Laboratory to conduct experiments in wireless telegraphy.

For these experiments a transmitting station was installed on the roof of the State, War & Navy Building in Washington and a receiving station was installed at Fort Myer, air line distance of about three miles.

At the conclusion of these experiments, he proceeded to Fire Island Lightship, N. J., to install what is claimed to

(Please turn to page 84)

HIGHWAY

HIGHWAY LINE CONSTRUCTION AND MAINTENANCE BODIES

Highway bodies are the result of years of experience in utility service. The practical designs we offer represent the combined experience of our engineering staff and that of the engineering construction staffs of utilities throughout the country. Let us help reduce your construction and maintenance cost.

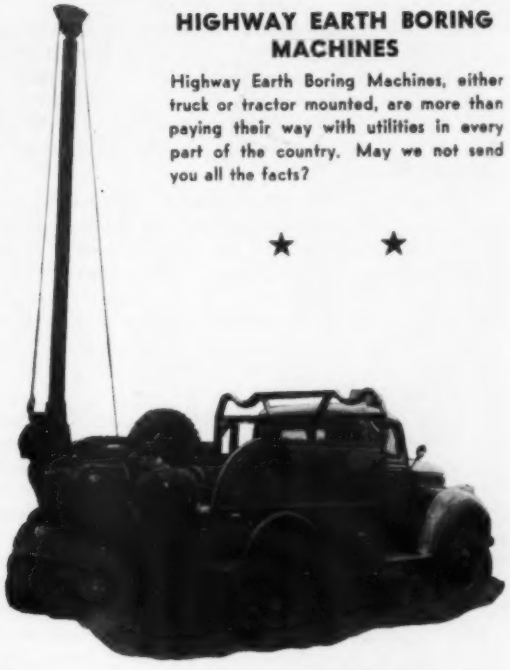
HIGHWAY INSTALLERS LINEMAN'S BODY

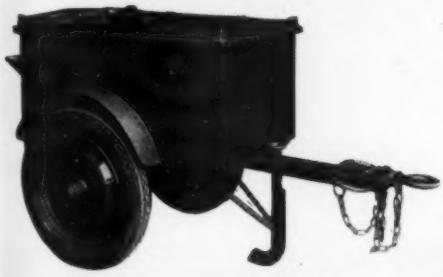
These bodies serve the widest range of utility needs—designed to be light of weight, yet ruggedness is built in—each type offers the utmost in convenience. Adaptable to today's requirements.

HIGHWAY EARTH BORING MACHINES

Highway Earth Boring Machines, either truck or tractor mounted, are more than paying their way with utilities in every part of the country. May we not send you all the facts?

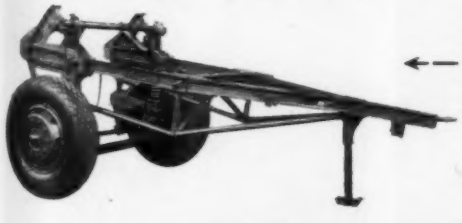
★ ★





HIGHWAY CABLE SPLICERS TRAILERS

A splicers workshop on wheels—weather proof, thief proof—and fire proof. Very compact—occupies small space. Let us send you specifications.



HIGHWAY WIRE LAYING PLOW

The unit shown used for laying farm lines underground. Other models available for plowing in cable. →

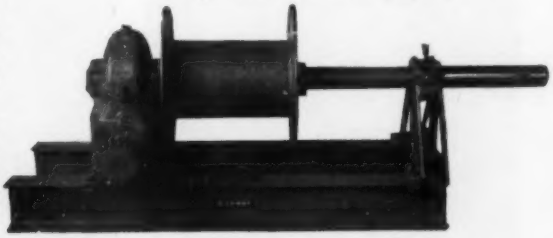
★

HIGHWAY CABLE REEL TRAILERS

Provide a quick and effective means of loading and transporting heavy reels of cable. Eliminates troublesome hand operated jacks. Easily loaded and unloaded. Made in two sizes. Ask about our Combination Pole and Cable Reel Trailer, developed especially for companies having a a limited need for a standard Cable Reel Trailer. ←

HIGHWAY WINCHES

Various types and sizes for all purposes.



★ **HIGHWAY TRAILER CO.** ★

EDGERTON WISCONSIN

be the first radio communication system regularly and publicly operated in America. This station was closed down to avoid interference with radio stations which were being installed by Signor Marconi at Highland of Navesink, N. J.; on top of the World Building, New York City, and on the steamship "Ponce" for the purpose of reporting the International Yacht Races between the American yacht "Columbia" and Sir Thomas Lipton's yacht "Shamrock First." This radio report, the first of its kind, was made to the New York Herald.

Then in October, 1899, he was ordered to General Electric's factory at Schenectady, N. Y., to inspect and supervise the crating and shipment of the first portable searchlight manufactured for the Signal Corps for field operation. This equipment was to be loaded on the U. S. Army Transport "Logan" and sent to the Philippines for installation there.

Ordered back to the Philippines in 1908 he was in charge of fire control construction projects on Corregidor until 1910 when he returned to the States. He was senior electrical engineer in the Signal Office, Department of the East, New York City, until World War I came along, at which time he was ordered to Charleston, S. C. in May, 1917, and organized the Signal Office, Southeastern Department, now known as the Signal Branch of the Fourth Service Command and is located at Atlanta, Ga.

He had command of that office as a major, Signal Corps, until December, 1920, except for two brief periods when he was superseded by a senior officer. He then reverted to his former civil service status as electrical engineer and has supervised the engineering and construction of communication systems under the control of that office to the present time. Mr. Taylor has not had a total of 30 days' sick leave nor 30 days' annual leave in any one year during his total tenure of service. Certainly this is an enviable record.

The experiences of Mr. Taylor have been many and varied, all of which, it is believed, would prove of interest to communication men. Due to lack of space only a few can be mentioned here.

In 1906, First Lt. George O. Squier, later Chief Signal Officer in World War I assisted by Mr. Taylor, was invited by Dr. Leich, attending surgeon at St. Vincent Hospital, Norfolk, Va., to take X-ray pictures of his patients. These were the first such pictures in that locality and they attracted considerable attention.

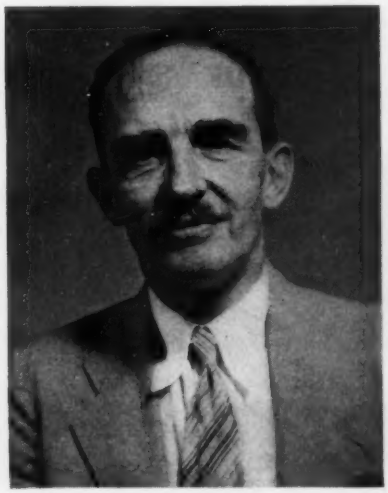
While en route to Puerto Rico in 1898, Mr. Taylor camped for some weeks at Ybon City, Fla., and was detailed as camp instructor on signal communication. This instruction, though important at that time, now seems minor for it consisted of setting up and operating two Morse main line sounders. Two field telephones were also used in the demonstration. These telephones were designed by Capt. James Allen, later Chief Signal Officer. Mr. Taylor states that he did not see a single telephone in active field service during the Spanish American War.

In 1900, the Signal Corps built an open wire line of three ten-pin crossarms for a distance of 128 miles out of Manila in the Philippines. When the material arrived from the States it was found that the crossarms were bored for one-inch pins although the pins furnished were one and three-quarter inches. Mr. Taylor and two sergeant assistants, namely Oliver G. Simmons, now a business man in Cleveland, Ohio, and J. E. P. Wood, recently retired from the position as electrical engineer from the New York Fire Department, were asked to solve the problem.

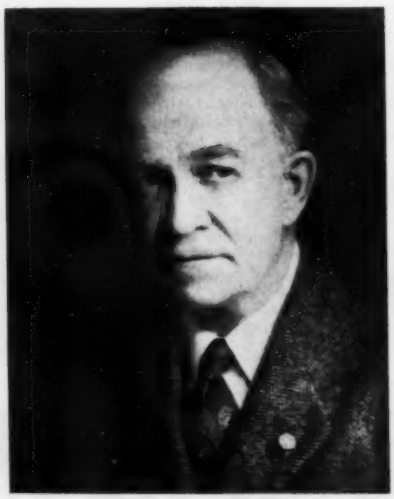
A rush order was sent to Hong Kong, China, for four one and one-quarter-inch twist drills and an attempt was

(Please turn to page 88)

WALTER TAYLOR who has completed almost 50 years in Army, most of them in the Signal Corps.



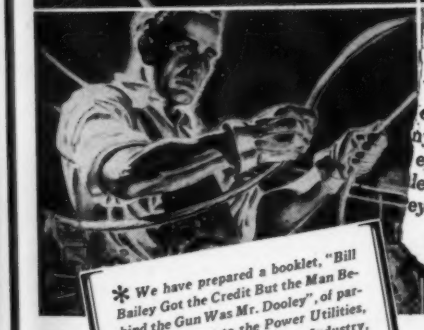
H. G. PHAIR
Signal Corps Engineer

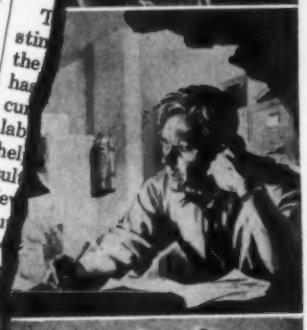


FREDERICK REICHENBACH
Signal Corps Engineer

L. W. OSBORNE
Signal Corps Engineer

Another Tribute to "Mr. Dooley"*





From the Editorial page of **The New York Times** *October 23, 1943*

CIVILIAN AWARDS

Testimony to the effect that the stimulus of the Army-Navy "E" and the Maritime "M" production awards has been very great constantly is accumulating. Both management and labor on the home front have been helped to even greater efforts and results by these recognitions of unselfish devotion to the great task of turning out the vital materials of war. Now both directors and workers in a category other than those previously recognized are to receive an achievement award for work well done. These are the seasonal processors of food. The fact that they are not year-round operators makes them ineligible for Army-Navy "E" recognition. But if they meet the same high standards demanded for that badge of honor they are to receive the award of the War Food Administration's "A" flag. Qualifications considered in selection for the award will include ingenuity in the development of war food products, low absenteeism, cooperation in the various food purchase programs, accident prevention and the like.

A number of vital factors on the home front still lack recognition in the form of public awards. The power and utility companies, the communications companies, and even the enormously busy railroads do not fall within the technical requirements for existing awards. There would seem to be little reason why the powerful incentive which existing awards for merit have supplied should not be extended to such fundamentally important elements as the electric light and power industry, which has shown an increase of 73 per cent in its kilowatt hour output since 1939; or the telephone industry, which last year handled 93 per cent more long-distance calls than in 1939; or the American railroads, which in 1942 increased the ton miles moved as compared with 1939 by 92 per cent and the passenger miles by 135 per cent in the same period. The service industries have done and are doing an outstanding war job. They, too, deserve an accolade.

* We have prepared a booklet, "Bill Bailey Got the Credit But the Man Behind the Gun Was Mr. Dooley", of particular interest to the Power Utilities, the Railroads, the Telephone Industry, and the Electrical Wholesalers. A copy will be sent in reply to any request on a company letterhead. Address: General Cable Corporation, 420 Lexington Avenue, New York 17, N. Y.

GENERAL CABLE CORPORATION

TELEPHONE WIRES AND CABLES

DISTRIBUTED BY

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SALES CORPORATION

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The first automobile owned by the Signal Corps.

made to ream out the holes. This was given a trial but did not prove satisfactory and the drills were soon broken. A special reaming tool was designed which worked perfectly and permitted the use of the material furnished.

Rats started eating or gnawing the lead-covered cable on Corrégidor and caused serious trouble. Fifty rat traps were purchased and a Filipino hired to catch and kill rats, which he did—hundreds of them.

The entrances to all ducts in manholes were sealed and drains covered with wire screen which corrected the difficulty.

The first automobile owned by the Signal Corps was a battery-driven wire truck purchased at Fort Myer in 1899. This truck was shipped to Manila later, and set up by Mr. Taylor and was the first automobile operated in the Philippines.

Small wooden telegraph offices were constructed in the Signal Corps shops in Manila with the various parts numbered in such a manner that they could be assembled by the use of wooden pegs which were carried on the cable ship "Burnside." When a new cable was landed, a hut was assembled, the cable connected to the instruments and the operator opened a new office for business immediately.

Mr. Taylor recalls the old Signal Corps Company "E" in the Philippines, which was officered by such well-known men as Capt. Edgar Russell, later a general in the AEF, First Lt. Billy Mitchell, later general in the Air Service, and Second Lt. Geo. S. Gibbs, later Chief Signal Officer.

The first common battery switchboards of the Signal Corps was installed at Fort D. A. Russel, Wyo., back in 1910, by Assistant Electrical Engineer Foster Veitaheimer.

L. W. Osborne another old-time Signal Corps engineer was appointed electrical assistant in the office of the Chief Signal Officer in 1905 and is still in the service. A Signal Corps engineer in those days had to be self-sufficient, states Mr. Osborne, as he was generally away from civilization and could not obtain engineering assistance so one was forced to work out his own salvation.

At this time, local battery switchboards were used throughout the Army and it was considered quite a feat to be able to install a complete common battery system.

In 1911, Mr. Osborne installed common battery systems at Fort Sheridan, Ill. and Fort Leavenworth, Kan. He served two tours of duty in the Philippines, first in 1916 and later in 1929, was commissioned first lieutenant in the Signal Corps in 1917, promoted to captain in 1919, reverting to his civilian status in 1920. Mr. Osborne installed one of the first automatic telephone systems of the Signal Corps at Fort Meade, Md., in 1921. During the present war Mr. Osborne has been attached to the Philadelphia Procurement District and the Newark (N. J.) Inspection Zone.

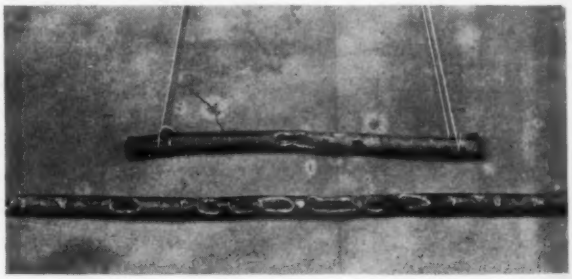
Mr. Osborne has been active in the training of men for duty as material inspectors.

C. E. Heston, presently in charge of government sales for the Stromberg-Carlson Co., was employed by the Signal Corps as an engineer from 1906 to 1911. During this period he was active in the construction of fire control systems on both the east and west coasts of the United States and served one tour of duty in the Philippines. Mr. Heston was also a major, Signal Corps, during World War I and was on duty in the Office of the Chief Signal Office in Washington, D. C.

Harry G. Phair, electrical engineer now on duty with the Headquarters Second Service Command, Signal Section, New York City, when approached for information to include in this article, makes the following statement which covers the subject so thoroughly that it is being quoted:

"When I entered the service in 1906, there were no 'Communication Engineers' in captivity and as for telephone engineers, there might have been a few in hiding in telephone companies, but most engineers that I knew in telegraph or telephone work were regarded as electrical engineers or electricians. The term 'electrician' was applied to anything from a 'hanger' of door bells to an expert in multiplex telegraphy. I was then more proficient at one than the other. Guess which?

"As for radio, or rather wireless, that was just something for electrical chaps to play with. Back in 1903, I



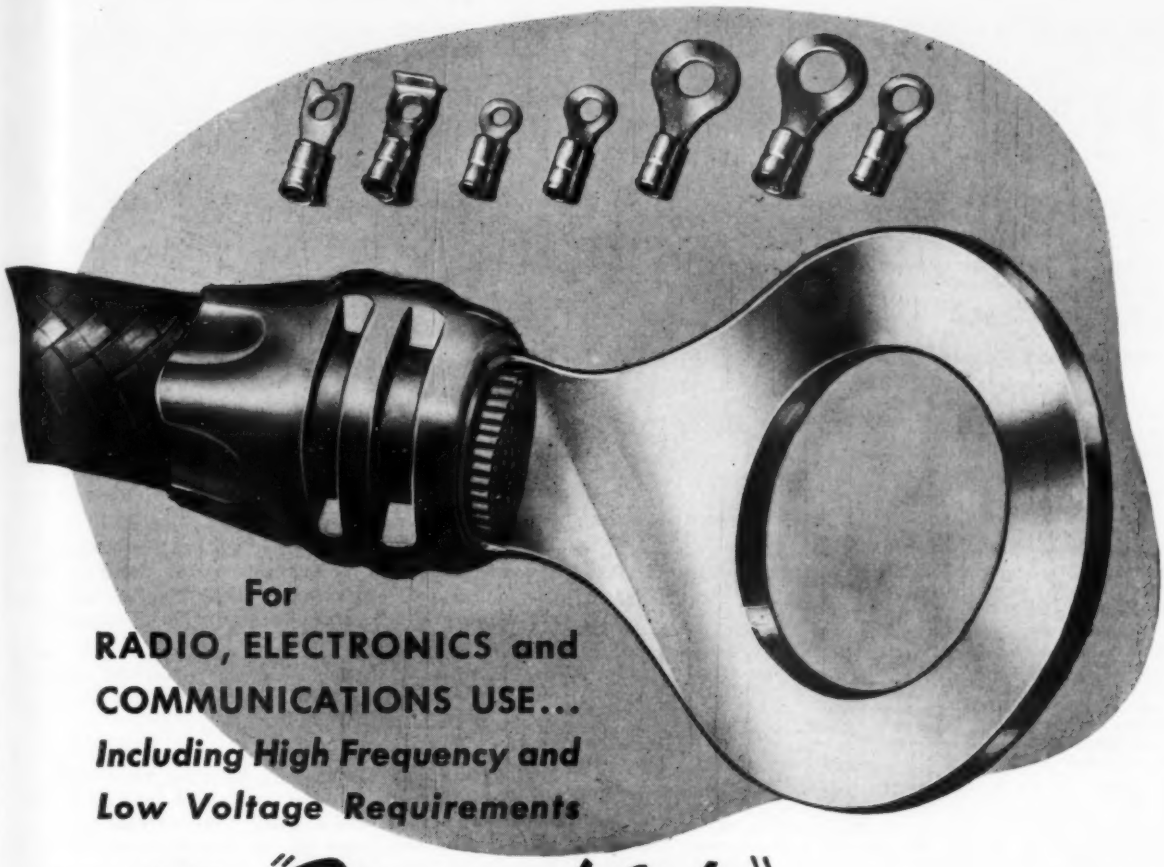
Sample of rat-eaten cable on Corregidor.

happened to be in charge of a testing laboratory for a concern that produced testing instruments, wireless spark gap transmitters, X-ray and high frequency electro-therapeutic equipment. Incidentally, we made the first coils for Marconi in this country and did work for Tesla and Dr. Fessenden. But note the wide variety—electrical testing sets, radio and medical equipment to which a few more etceteras could be added. In the flaming youth of communications development, the world was our apple.

"Once upon a time, a Signal Corps engineer like the legendary Proteus had to assume many different forms. He was supposed to do anything, personally and physically, from drilling concrete by hand, typing reports on his Blickensderfer, buying and following up deliveries, watching the stockroom, checking time, drawing plans and designing layouts, preparing detailed permanent records, testing cable, and so on, that is when he was not mounting telephones, wiring switchboards or pulling cable and, at the same time, supervising the temporary labor or more temporary soldier details and keeping the peace with the post commander.

"He was not a specialist but a general practitioner, and very much on his own. This recollection suggests a para-

(Continued on page 92)



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Including High Frequency and Low Voltage Requirements

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Insulation Support Terminal

This pure copper solderless insulation support terminal is being specified in large quantities by the electronics industry because "Diamond Grip" is engineered for hundreds of varied applications where severe service conditions demand the use of a terminal giving superior mechanical and electrical characteristics — installed quickly and economically.

The patented design of the terminal gives maximum service efficiency of the crimped connection; "Diamond Grip" is approximately 1/32" shorter and 32% lighter in weight than other insulation terminals for the same wire sizes; the self-gauging precision-die hand, foot, and power installation tools are setting new production records even with untrained help . . . "Diamond Grip" is not just another solderless terminal — it is a scientifically engineered method of obtaining the highest quality connections. If you have not already investigated AMP "Diamond Grip," write today and we will gladly send you all the facts.

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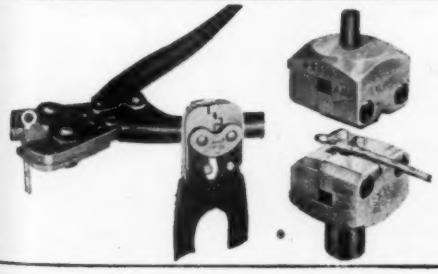
AIRCRAFT-MARINE PRODUCTS INC. AMP SOLDERLESS WIRING DEVICES

"Precision Engineering Applied to the end of a Wire"



THREE PERFECT CRIMPS AT ONE TIME

Diamond Grip Precision-die hand, foot and power operated installation tools materially reduce production time and assure uniformity of application without the necessity of worker pre-training. These self-gauging tools make three perfect crimps at one time —every installed terminal is the exact duplicate of all others in the line.

THE AMP SYSTEM OF SOLDERLESS WIRING

Unbiased laboratory tests of AMP Diamond Grip Terminals show no significant change in resistance even under the severest operating conditions, including a multiplicity of circuits, variations in current, voltage, temperatures and corrosion.

Write today for Bulletin No. 19.

Signal Corps cable ship BURNSIDE laying cable in Philippines in early days.

A submarine cable landing in the Philippines during early days.

phrase of a one-time familiar slogan of the Postal Telegraph Cable Co. that went something like this: 'Have you ever stopped to consider the progress in communications since Blain (included for courtesy) and Phair entered the field?'

"As electrical folk we knew or were supposed to know all about everything remotely electrical. The engineer embraced within himself all departments of telephone, telegraph, cable, and radio companies as well as general contracting. We were then spread out so thin that we could not possibly have been as thick as engineers nowadays.

"By the way, and on the side, I was a contributor to TELEPHONY once. I wrote the feature article for the November, 1914, number on 'Tropical Depreciation.' Among other things, I remember telling how we dispatched the rats that feasted on our lead cable in the Philippines. If we had been more kind to the animals, there might have been more alive today to plague the Japs, so you just don't know what to do.

"You may not know that the Signal Corps, back in 1920 or 1921 came pretty close to having the first public radio broadcast station. We got a station going at Fort Wood on 1450 meters, but by the time we had overcome bureaucratic delay, Westinghouse beat us to it. Some radio celebrities got their start on our crude station, but as we had no 'soap opera' contracts or generous sponsors and as we received no government encouragement or support, competition drove us to the wall after a year or two.

"As an illustration of the lack of practical radio knowledge, at that time when crystal receiving sets were all the rage, we had advice from a high Signal Corps radio authority that to obtain Arlington time signals at Army posts would require an antenna wire one-quarter mile long. Neverthless, we made up radio time service sets from obsolete war material as a substitute for rented time service and were able to get by with antennas of about 200 feet or so. No doubt, 20 years from now, however, our present day knowledge and practice will seem just as primitive and undeveloped."

The experiences of Joseph N. Craver, Signal Corps senior radio engineer, are considered to be of particular interest, since he was enroute to the Philippines for duty when the Japs hit Pearl Harbor. The convoy on which he was traveling was diverted to Brisbane, Australia, where he arrived on December 21, 1941.

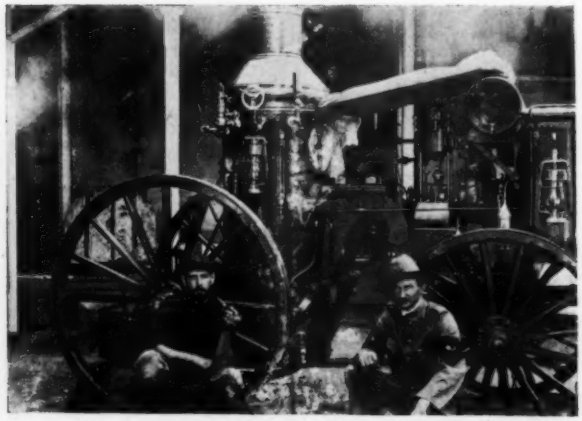
He later went to Java for important Signal Corps work, but was evacuated to Australia before the Japs arrived. He is now on duty with the Plant Engineering Agency, Office of the Chief Signal Officer, in Philadelphia, Pa.

Another Signal Corps engineer with a long service record is Frederick Reichenbach, senior electrical engineer of the Signal Branch of the Headquarters, First Service Command, Boston.

In his 30 or more years of communication work, Mr. Reichenbach has had many interesting experiences, most of them overseas. A brief outline of his travels sounds like an extensive Cook's tour: Two tours of duty in the Philippines; two years on the Pacific Coast, doing field work which extended from Rockwell Field, near the Mexican border, to the Canadian line; short visits to the Hawaiian Islands, Guam and Panama; about two years' service as a major in the Signal Corps in World War I, and, to top it all a four months' trip from the Philippines to New York by way of the Netherlands East Indies, Singapore, Hongkong, Shanghai, and numerous cities in Japan. This trip was interrupted when, in Pekin, on July 7, 1937, the Japs bombarded the city. However, Mr. and Mrs. Reichenbach were able to resume their voyage, returning to Tientsin in a refugee train provided by the British ambassador.

Since 1939, Mr. Reichenbach has been stationed in Boston

(Please turn to page 112)



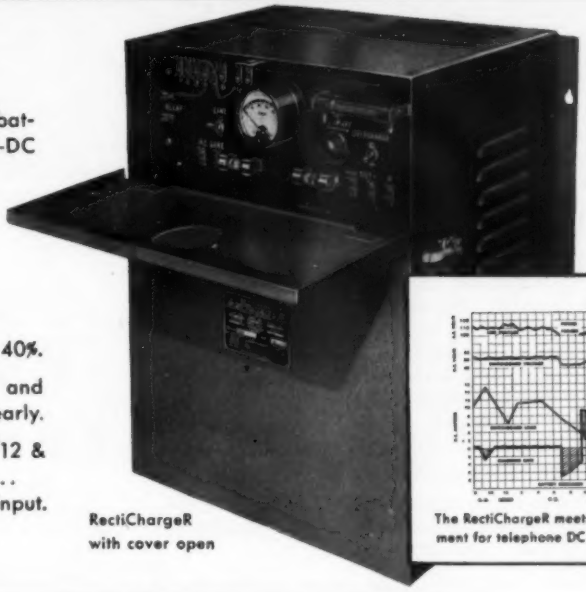
The first Signal Corps steam operated searchlight. SGT. W. R. TAYLOR is the man in uniform in the left photo.

RAYTHEON Equipment For Telephone Service

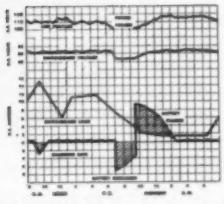
RECTICHARGERS

A Raytheon RectiChargeR and batteries provide an automatic AC-DC power system. RectiChargeRs—

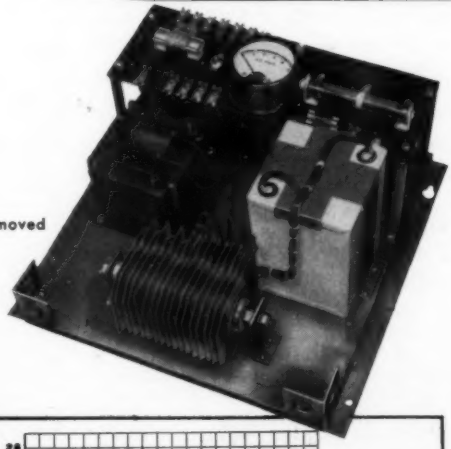
- Keep batteries fully charged.
- Prevent overcharge and undercharge.
- Eliminate voltage variations.
- Increase battery life as much as 40%.
- Reduce battery maintenance and inspection to once or twice yearly.
- Complete range of units—11/12 & 22/24 cells . . . 1 to 12 amps . . . many models for 50 cycles input.



RectiChargeR with cover open



The RectiChargeR meets every requirement for telephone DC service.

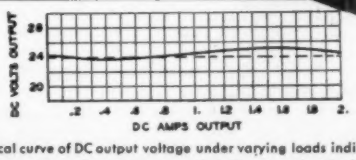


RectiFilteR with cover removed

RECTIFILTERS

(battery eliminators)

- Eliminate batteries and the expense of routine service.
- Release charging cable pairs for revenue producing service.
- Provide stabilized DC output voltage from no load to full load regardless of AC variations.
- Minimize power costs because of high efficiency in converting AC to DC.
- Save $30 to $90 a year.
- Wide range of models for varied operations . . . 50 or 60 cycles.



Typical curve of DC output voltage under varying loads indicating uniform voltage for proper operation of automatic telephones.

Raytheon RectiChargeRs and RectiFilteRs are entirely automatic in operation . . . have no moving parts . . . and require no maintenance.

The coveted Army-Navy "E", for Excellence in the manufacture of war equipment and tubes, flies over all four Raytheon plants where 12,000 men and women are producing for VICTORY.

RAYTHEON MANUFACTURING Company

190 WILLOW ST. WALTHAM, MASS.

Civilian Engineer Positions

THE development of Signal Corps communication during and immediately following the Spanish-American War brought about a need for communication specialists in the Army which was met by the hiring of civilian engineers. Some of these first engineers were employed at $75 a month, although the average rate of pay was from $1,200 to $1,400 a year, with a top salary of $1,800 a year. This was considered "big money" back in those days when personal needs were few and prices in general were low.

Signal Corps field engineers are frequently assigned to the signal section of the service commands and act as technical advisers to the signal officer on both wire and radio communication matters. Signal Corps engineers are not generally used on field communication matters, as these are usually handled by signal companies. The work of the civilian field engineer is almost entirely on administrative or permanently-installed communication facilities. Signal Corps engineers in the laboratories, however, do assist with the development of all types of communication equipment, including that used by troops in the field.

Due to the tremendous increase in Army communications, it seems probable that a large number of engineers will continue in the Signal Corps after the war.

Civilian engineer positions in the Signal Corps are in the classified civil service. This means that they are subject to civil service law, and are filled in accordance with regulations of the United States Civil Service Commission. Graduates in engineering who feel attracted by the idea of a career in the government service may be interested in looking into certain of the civil service procedures.

The first step in obtaining government employment is to submit an application to the Civil Service Commission. The commission has the responsibility of determining, through appropriate examinations, practical in character, whether applicants for government employment possess the necessary qualifications.

Civil service examinations are either assembled or unassembled. In assembled examinations, applicants go to an examination room and take a written test. In unassembled examinations, competitors are rated on their education and experience, as shown in their applications for employment, and on corroborative evidence obtained by the Civil Service Commission. Most of the engineer examinations are unassembled.

The names of competitors whose ratings are 70 or above are placed on a "list of eligible." From this list, the commission certifies the names of eligibles to appointing officers in the various federal agencies, as vacancies occur.

If you qualify in one of the engineer examinations, your name may be certified to the War Department.

Engineer positions are in the "professional and scientific service"—one of the broad groups into which federal positions are divided by the Classification Act of 1923. There are eight grades in this service—referred to as P-1, P-2, P-3, and so on. The following table shows the entrance salary for each grade (in the first column) and the salary steps within each grade:

Grade	*Basic pay rates*						
P-1	$2000	$2100	$2200	$2300	$2400	$2500	$2600
P-2	2600	2700	2800	2900	3000	3100	3200
P-3	3200	3300	3400	3500	3600	3700	3800
P-4	3800	...	4000	4200	4400	...	4600
P-5	4600	...	4800	5000	5200	...	5400
P-6	5600	...	5800	6000	6200	...	6400
P-7	6500	...	6750	7000	7250	...	7500
P-8	8000	...	8250	8500	8750	...	9000

The above salaries are the basic salaries; they do not include war overtime pay. Overtime compensation for the present 48-hour federal workweek amounts, on an annual basis, to approximately 21 per cent of that part of the basic salary not in excess of $2,900 a year. For example, the total annual earnings of an employe with a basic salary of $3,200 would be $3,828.24—$3,200 plus overtime pay of $628.24.

It is the general practice of government agencies to fill the higher professional positions by promotions from within, and for this reason most of the entrance appointments are to fill junior professional assistant positions—better known as P-1 positions.

However, there are a number of other specific engineering positions being filled by civilians in the Signal Corps. A few of those listed by the United States Civil Service Commission are:

Trainee repairman, Signal Corps equipment.
Radio mechanic-technician.
Radio intercept officer.
Inspector, Signal Corps equipment.
Radio inspector.
Radio monitoring officer.

Promotion

There are four ways in which an engineer may be promoted while serving in the Signal Corps:

(1) If qualified, he may be considered for promotion to a position in a higher grade.

(2) The position in which he is serving may accumulate additional duties and responsibilities to such an extent as to warrant reallocation of the position to a higher grade.

(3) Salary increases of one step within the grade are given each 18 months to employes in grades up to and including P-3, and each 30 months to employes in grades from P-4 to P-8, provided (a) no other equivalent increase in compensation has been received during the period, and (b) the employe's efficiency rating—a periodic evaluation of the employe's performance on the job—is sufficiently high.

(4) An additional salary step may be given for especially meritorious service on the job.

Annual and Sick Leave

Employes, other than temporary, earn annual leave, with pay, at the rate of two and one-sixth days a month. Such leave—used for vacations and similar purposes—may be accumulated up to a maximum of 90 days. During the war, restrictions are placed on the amount of leave an employe may take at any one time.

(Please turn to page 98)

THE BEST CREOSOTED PINE POLES AVAILABLE

TAYLOR-COLQUITT CO. T·C TIMBER CONSERVATION

We are proud to have been of assistance to the Signal Corps by furnishing creosoted pine poles *on time* for many battle-front communication lines.

Taylor-Colquitt stocks and production capacity make quick shipment of large quantities of creosoted pine poles possible. With facilities for large scale production is meticulous attention to every detail of forest selection, seasoning and application of preservative treatment — attention which assures users of the finest poles that can be produced.

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TAYLOR-COLQUITT
CREOSOTED PINE POLES

Sick leave, with pay, is granted to employes who are unable to perform their duties because of sickness or injury. Employes earn sick leave at the rate of one and one-quarter days a month. Sick leave, like annual leave, may be accumulated up to a maximum of 90 days.

Retirement

Retirement pay is provided for all regular civil service employes. A 5 per cent retirement deduction is made from the salaries of all employes whose positions are subject to the Civil Service Retirement Act.

Members of the armed forces who enter the civil service may receive credit for their years of honorable military service, provided that the same service is not used also as the basis of a military pension.

So long as an employe is on the pay roll, in active or in furlough status, his compulsory contributions earn him 4 per cent per annum compounded as of June 30 each year. When an employe leaves the civil service after serving five years, and does not withdraw his account, it earns him 3 per cent per annum to the date annuity begins.

Contributions may be refunded to an employe separated with less than five years of service to his credit. If the separation is involuntary, but is not for cause on charges, all contributions plus interest are refunded. If the separation is voluntary, or if the employe is removed from the service because of misconduct, all contributions plus interest are refunded except the "tontine" ($1 a month) which is retained in the retirement fund.

An employe who receives a refund as above indicated and later reenters the service must redeposit (with interest) all the refund applicable to his service. If this is done on a partial-payment plan, it is necessary to pay interest on the diminishing balance at the rate of 4 per cent compounded annually.

An employe who has served at least 15 years must, at the age of 70, withdraw from the service unless continued by executive order or unless the head of his department reappoints him because of his special qualifications. If he had not had 15 years of service at the age of 70, he may, if his department head is willing, remain in his job until the 15 years are completed.

An employe who has served 15 years or more may retire at any time after having reached the age of 62. An employe who has served 30 years or more may retire at any time after having reached the age of 55.

The money each employe puts into the retirement fund, plus the interest it earns, establishes for him an individual account which, at the time he becomes eligible for anuuity benefits, will buy a certain amount of annuity. To this amount, the government adds a fixed sum which in no case will be less than the individual employe's account itself will buy.

There are three plans under which benefits may be paid to annuitants. When an employe becomes eligible for retirement benefits, the Civil Service Commission figures up his account and computes the annuity under whichever of the three plans will produce the highest benefits.

The plans, and their comparative yields, are as follows:

Plan 1. To the amount which the employe's account will buy, the government will add $30 for each year of service, up to a maximum of 30 years.

Plan 2. Here the highest average salary (but not in excess of $1,600) an employe made throughout any five consecutive years of his service is multiplied by the total number of years he served (but not in excess of 30) and divided by 40.

Plan 3. Here the highest average salary (without limit) an employe made throughout any five consecutive years of his service is used. This is multiplied by the total number of years served (but not in excess of 35) and is divided by 70.

G. VAN SIZE (left), J. C. CRAVER (center) and A. D. MARTIN are radio engineers of the Plant Engineering Agency.

Four engineers in the sea coast defense sub-section, Engineering Branch of the Plant Engineering Agency. They are (left to right) K. G. COOPER, A. H. NEWTON, H. F. BOSSERT and J. W. WRIGHT.

This group of Plant Engineering Agency engineers represents a total of 292 years of service or an average of 36.5 years per man. All of them are hale and hearty and working hard every day. (L. to R.) J. H. FAIRLAMB, J. M. MILLER, J. W. MASON, D S. HILBORN, E. B. TUTTLE, T. G. SOUTHWELL, H. F. TIMMINS and J. D. TAYLOR. All retired from the Pennsylvania Bell except Mr. Timmins and Mr. Taylor who are retired from the Northwestern Bell.

These engineers of the Plant Engineering Agency are, left to right, R. W. EDDY, W. J. ROYEN, JOE CHEESMAN, R. S. BOYKIN, H. A. TEALL, J. D. BRENNAN, C. K. BUDD, K. T. THOMAS, G. O. TAPPER.

This group, left to right, are E. A. GOLLINS, C. W. PARKER, M. E. ESTERNAUX, W. F. BLAKENEY, C. C. DICKERSON and W. A. TURCZYN. They are on leave from the New York Telephone Co. and are on duty as engineers with the Plant Engineering Agency.

* * *

Full information in regard to positions in the federal service for which applications are being accepted, or in regard to civil service matters generally, may be obtained, without cost, from the Secretary, Board of U. S. Civil Service Examiners, at any first- or second-class post office.

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Many practical uses include pulling guy wires, pulling messenger strand, lowering or raising heavy cables, pulling poles, straightening poles, pulling line wire, pulling ground rods, lowering conduit structures, pulling cable into manholes, pulling aerial cable for splicing and handling heavy central office equipment.

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DANVILLE, ILLINOIS

SIGNAL COMMUNICATION IN JUNGLE WARFARE

IN JUNGLE operations, signal and communication personnel are meeting and overcoming problems which challenge their strength, endurance and ingenuity to the utmost. It is believed that the experience of these specialists, who have pioneered and developed workable operation procedures under combat conditions, will be of considerable help to all who may face similar problems in the future.

Contrary to popular belief which existed before the war, jungle terrain is not necessarily flat or always swampy. Primarily it is a densely-overgrown mass of trees, vines and brushes, inter-

Signal supplies being hand-carried from the ramp of a landing barge.

Wire laying in South Pacific is usually a hand operation. Extra man serves as guard and gun-bearer.

FOR A RECORD OF ACTION

When and where it is desirable to make a permanent record of information or instructions spoken through microphone, telephone or radio, the Dictaphone Electricord Belt Machine will do it, quickly and efficiently.

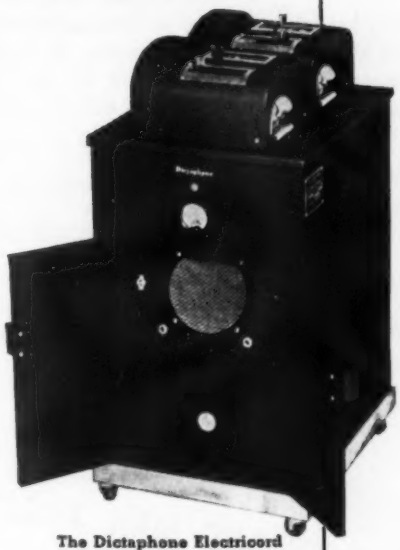
For instance, in airplane control centers installations of this Dictaphone equipment record all flight instructions on flexible, plastic belts, three and a half inches wide by twelve inches in circumference, which are inexpensive, tough and practically unbreakable. They can be folded and filed away without damaging the recording, and a great many of them can be stored in a small space.

Dual recording and reproducing units provide continuous operation. Constant sound track speed on the entire recording surface permits listening back at any point, while the machine continues to record.

Dictaphone Electricord Belt Machines are sturdily constructed for hard use. Conveniently located controls include a power level, indicator and a jack for headphones. The assembly includes a built-in loudspeaker, and a high-gain amplifier incorporates automatic volume control.

A portable reproducer is also available. This is equipped with variable speed control, for reproducing high-speed recording at slower rates.

The Dictaphone Portable Belt Recorder-Reproducer with variable speed control.



The Dictaphone Electricord Belt Recorder-Reproducer.

All Dictaphone Electricord equipment is designed and reserved for the armed services and their direct suppliers. For information, phone or write Dictaphone Corporation, 420 Lexington Avenue, New York. Washington Branch Office: 733-15th Street, N.W., Washington, D. C.

ARMY-NAVY "E"

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The word DICTAPHONE is the registered trade-mark of Dictaphone Corporation, makers of dictating machines and other sound recording and reproducing equipment bearing said trade-mark.

The Dictaphone Portable Belt Reproducer, with variable speed control.

IMPORTANT

TO OWNERS, MANAGERS AND PLANT MEN OF SMALL EXCHANGES

● Since there are no late books to meet requests for information on central office circuits from men in small Independent exchanges, TELEPHONY early in January will begin the publication of a series of articles describing the circuits of switching equipment of all Independent manufacturers, manual and automatic, designed for smaller exchanges.

● Harry E. Chapman, long-time telephone engineer of Galesburg, Ill., has been engaged to prepare approximately 17 articles to cover the circuits of standard switching apparatus for small exchanges made by all Independent manufacturers. Each circuit will be broken down and analyzed and each operation will be traced in detail to make every feature as clear as possible.

● The articles will be elementary as they are intended primarily to assist the man in the smaller exchange to clear central office trouble without delay or difficulty. They also will serve as a useful review of the latest circuit improvements for the more advanced central office technician.

● All small companies, as well as large companies with small exchanges, will want to enter additional subscriptions to TELEPHONY immediately so that all men working on switching equipment will have personal copies of this important and helpful series of articles for study and future reference.

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COMPANY_____

woven with waterways and narrow native trails. In the jungle itself the ground is damp and spongy. This condition is due to the numerous layers of half-rotted vegetation which are seldom reached by the sun. Hills may be wooded or merely covered with low brush and grass.

Disease, fatigue and fear of the jungle and of enemy tactics, all take their toll in decreasing the ability of the uninitiated to live, move and operate efficiently in jungle combat. Only by physical and mental adjustment obtained through training operations in jungle areas outside the combat zone, can troops be seasoned to endure the hardships and continued operations successfully.

Signal communications troops must be at least as well seasoned as combat troops, since their responsibility for installing, operating and maintaining communication systems continue even during periods of inactivity on the part of line troops. All troops must have a working knowledge of personal hygiene and first aid drilled into them until it becomes second nature.

Concurrently with learning how to take care of themselves, communication men must learn to care for their equipment under the most adverse conditions encountered in global warfare. In many cases, standard practices for operation and maintenance successful elsewhere must be modified or completely changed.

Leather, webbing and metal deteriorate quickly and soon reach a state of complete uselessness if not serviced frequently. This condition can be minimized by supporting equipment at least one foot off the ground, but can be overcome only in communication equipment by a periodic drying process. Several ingenious types of drying ovens have been used for this purpose. Equipment has to be made as waterproof as possible to withstand high humidity and as sturdy and shockproof as possible to endure rough handling during transportation along jungle trails.

Standard ties could not be used to advantage because insulation rotted quickly at tiepoints, permitting grounds and shorts to develop rapidly when strain placed on the wire stripped the insulation. When time permitted, scrap wire or marlin was used to make basket weave ties. These ties permitted the wire to move laterally and helped to absorb vertical stresses caused by falling branches.

The installation of open wire or field wire on crossarms was made only after enemy forces, including snipers, had been driven from the area.

Photo by U. S. Army Signal Corps

PORTER

HAND POWER TOOLS

The tools that go to the job, on the bench, on the floor, or out on the work—*the tools that need no power except a good pair of hands—the tools that multiply manpower to cut bolts, rods, flat stock, wire and stranded cable—quick and clean.* The tools that save time, save men and solve emergency problems. The tools that are now demonstrating to our Armed Forces their amazing power, durability and reliability by cutting through the barbed wire entanglements in the far-flung battlefields of the world.

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Strand Wire and Cable Cutters—Bolt Clippers—Pole Pruners

Capacities up to ¾" soft wire rope or ⅝" hard rope. Special tools to cut hard steel. Special models engineered to meet special requirements—pressing, rivet squeezing, crimping, etc.

Write for new maintenance book and/or catalog illustrating all models with valuable information.

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to
Concrete, Brick or Stone

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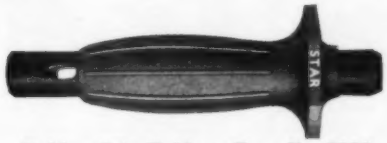
Masonry Drill Points and Drill Holders



Rubber Grip Holder—Type No. 5200
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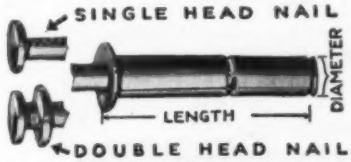
Knockout Pin

Plain Holder—Type No. 5400

Hammer Drill Point—Type No. 4200

★STAR DRYVIN
Hammer Drive Anchors—Type No. 3900



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Machine Bolt Shields—Type No. 4000

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Westinghouse RECTOMATIC

Self-Regulating Battery Charger

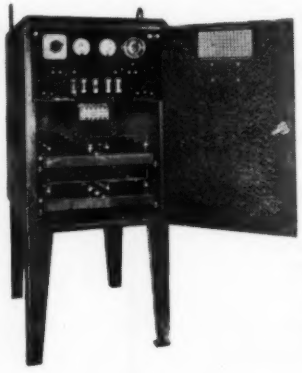
★ The Rectomatic is particularly adaptable for floating battery service. At full load its efficiency is approximately 45% and will vary with load changes; power factor is approximately 55% at full load. For other than battery service, send special application data to your nearest Westinghouse Sales Office. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Dept. 7-N.

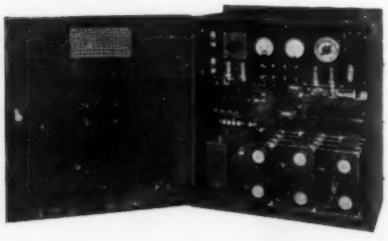
J-21305

FULLY AUTOMATIC. The Rectomatic is a self-regulating type of Rectox rectifier. It is set to regulate at an average cell voltage of 2.15.

ACCURATE. Holds cell voltage at 2.15 plus or minus 1% even when a-c line voltage varies plus or minus 5%.

NO MOVING PARTS. Absence of rotating parts and relays insures trouble-free operation and practically no maintenance.





PRACTICALLY UNLIMITED LIFE. Life tests lasting years have failed to show any limitation in their life.

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Signal Corps Ahead In Italy

[Editor's Note: The following article was received in the Office of the Chief Signal Officer from a war observer attached to the American Fifth Army now battling in Italy.]

Communications, like rations, is one thing the artillery, engineers and doughboys depend on at all times, particularly in a landing operation.

And communications those troops had when they invaded the Salerno sector on "D" Day, September 9, 1943, when virtually every type of troops in the Fifth Army hit the sand.

This wasn't all happenstance. It came about through careful planning by the Signal Corps.

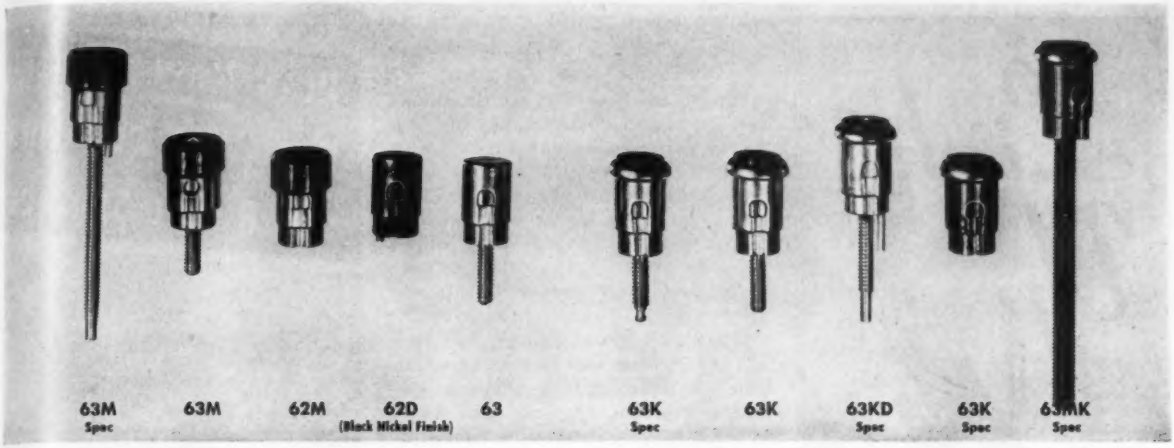
Communications with ships in the harbor—command ships, rather than the conventional well-grounded Army command posts — were established at almost the precise moment the first troops set foot ashore, and although maintenance of these lines was rugged at times, there were few instances where the troops ashore were out of instant contact either with their sister platoons, companies, battalion or regimental headquarters or the higher echelons of command.

The work of the Signal Corps was inspiring, and in order to furnish the high command with the necessary verbal picture, these men frequently got out ahead of the combat troops.

In Italy, one Signal company actually got ahead of the infantry, with the result that the information they telephoned back to the heavy guns of the destroyers, cruisers, and other craft in the harbor offshore brought about the destruction of German Mark VI tanks which threatened the whole landing party.

Though virtually every type of equipment the signal companies had at their disposal that day, and for days to come, was in use, there was little opportunity to determine which piece of equipment was the most valuable. Like the artilleryman or engineer, it all depended on whom you talked with—each had his favorite. The consensus was, however, that the "handie-talkie"—that small compact radio set that gives the platoon an opportunity to communicate with its company commander or battalion leader instantly—won universal approval. It provided the much needed communication with isolated groups and parties sent forward to reconnoiter.

Regimental communications officers were generally high in their praise of the 600 series, which gained considerable use during this invasion.



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1. The spring — unseen but most important, is designed for long life with minimum pressure loss in service — corrosion resistant.
2. The "D" shaped hole grips the finest wire and holds it in perfect contact. This special Eby construction gives correct, uniform tension across the entire surface of the wire.
3. Eby spring posts have dual guides — makes positive alignment of insertion holes.
4. Made from the highest quality material to meet rigid manufacturing standards and assure maximum electrical conductivity.
5. Recognized standard finishes are nickel, silver, black nickel, and cadmium.
6. Insulating bases, shields, bushings, and spacers in bakelite and ceramic.
7. Cap markings are supplied such as: ANT; REC; GND; HI; A; C; Line; —; +; L1; L2.
8. Most items are carried in stock in sufficient quantity to assure quick preliminary deliveries.

Eby Spring Binding Posts are made to a traditional standard of quality and workmanship, backed by years of experience and a long list of satisfied users. The actual styles shown are illustrative of the wide variety and the great possibility of the use of Eby Spring Binding Posts.

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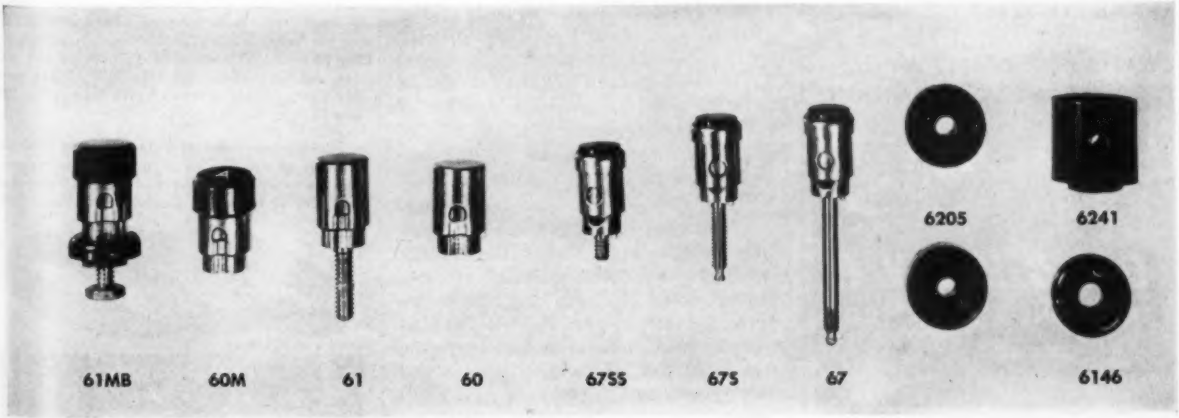

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TELEPHONE & SUPPLY CO.
COLUMBUS, OHIO

the equipment had to be brought ashore in "ducks" which frequently shipped water in the high seas.

During the height of the operations the divisional signal company lost one jeep when it came into contact with a mine. The battery of another went dead, thus cutting down the mobility of the signalmen, but nevertheless they went ahead, sometimes on their bellies, stringing wire and getting switchboards and other apparatus into operation.

When darkness settled on "D" Day and the division was fairly well established on shore, an inspection disclosed that contact had not only been maintained with the front line unit, but also with those on each side of the division. When the first day ashore came to an end, the company found that it had established four switchboards over which was operated a net of telephones. In addition, it had installed six telegraph sets, laid one-half mile of field wire, and three miles of assault wire.

On the assault phase of the operation, some 200 tons of signal equipment was brought ashore by the Fifth Army and its respective units. However, where they had hoped to salvage some of the wire that was left behind by the Germans, they were disappointed, for the enemy had not only cut the wire but had carried away whole sections so as to make any salvaging operations extremely difficult. Not only did Jerry carry away the wire, but to make things even more difficult, he cut down poles, while at the base of others he planted booby traps and land mines to catch the careless soldier.

In the first 10 days of the operation in Italy, 400 miles of fixed wire was laid in addition to 300 miles of assault wire.

V V

Former Traffic Supervisor On Headquarters Staff

The regimental pins placed on her shoulders by Col. Frank H. Curtis, commanding officer of the 15th Signal Training Regiment, WAC Lt. Virginia A. Fritz recently became a member of the 15th headquarters staff at a brief ceremony witnessed by the entire headquarters staff at Fort Monmouth, N. J.

Lieutenant Fritz, formerly a supervisor and instructor for the Michigan Bell Telephone Co., who attended the Officers' Candidate School at Des Moines, Iowa, has been assigned to the personnel office. She was on duty at the recent Quebec conference where she conducted the information service and helped in compiling the telephone directory.

PLAN NOW TO MEET POST-WAR DEMANDS FOR RURAL SERVICE

Specify Crapo High-Tensile Line Wires!

Rural America will offer vast possibilities for the expansion and improvement of telephone service after the war. Alert to the potential needs of this market, wise telephone men are laying plans now to meet expected demands.

The contemplated program of expansion and replacement will be made possible economically by Crapo HTL-85 and Crapo HTL-135. These high-strength steel line wires, with their superior transmission qualities, provide for longer spans and fewer pole structures with consequent savings in both material and labor. Their extra strength affords a greater margin of safety, helps minimize service interruptions and reduce maintenance cost.

Crapo HTL-85 has 60% greater tensile strength than B.B. wire; permits spans of 225 feet in heavy loading to 375 feet in light loading districts. Crapo HTL-135, with two and one-half times the strength of B.B., makes possible spans of 350 feet in heavy loading to 500 feet in light loading areas.

Plan now to take advantage of the practical features of these wires in your post-war program. Ask the nearest distributor of Crapo Galvanized Products or write for Bulletins 201 and 202.

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

Communications In The Pacific

(Concluded from page 36)

Popular impressions of Hawaiian vegetation stress palm trees and grass skirts, but the Signal Corps had little, if any, time for these. When not slicing themselves on the knife-like lava, the Corpsmen were chopping their way through underbrush consisting of sharp-thorned algeroba, scrubby kiawa trees, and lush, dense, tropical vegetation.

These and other Signal Corps units in Hawaii were under the command of Col. C. A. Powell, Hawaiian Department Signal Officer. It was his regular custom to have all section heads meet once a week for dinner and a round-table discussion. One speaker from the Signal Corps, or from some other arm of the service, would speak on his unit's work, problems and experiences, following which each officer would report on his section's progress. This procedure was found extremely helpful in coordinating various activities, and giving all concerned a better perspective of the work of the current week.

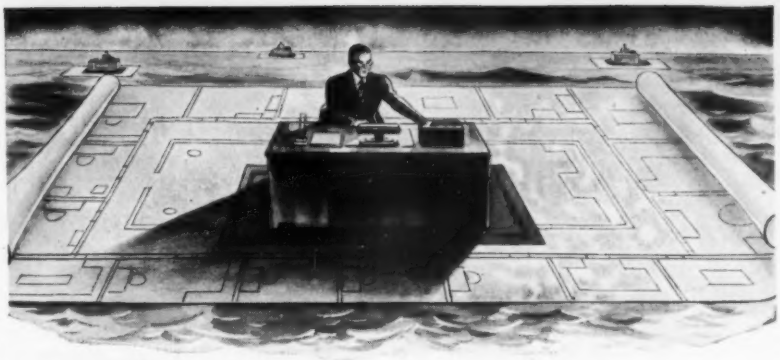
Besides their construction work, the Signal Corps men do a great deal of actual fighting. In fact, Colonel Kendall made several mentions of lessons to be learned from combat in the New Guinea area, where signal men, stringing wires in the trees, would occasionally pocket their pliers long enough to whip out a pistol and send a Jap sniper tumbling from another tree. Among the lessons are:

(a) Appreciation of the high standards of physical fitness required by personnel operating under the conditions obtaining in our South Pacific outposts.

(b) The need for a thorough knowledge of self defense by all Signal Corps troops. This includes an understanding not only of the rifle, pistol and semi-automatic, but a real fighting knowledge of the knife as an aggressive weapon.

V V

During World War I, the Signal Corps with the AEF built 2,000 miles of pole line and strung more than 70,000 miles of wire in France. They also operated 133 fixed telegraph stations and 273 fixed telephone exchanges.



Marooned

ON A FLOOR PLAN?

Floor plans of busy offices and plants don't always take quick, convenient intercommunication into account. So often an arrangement that otherwise expedites a business leaves key executives as high and dry as on a desert island when it comes to getting in touch with each other.

In these busy war days you will find that many of your subscribers are just waiting to have you bring them the message of Teletalk Amplified Intercommunication . . . to tell them how Teletalk breaks down the barriers of walls and square feet and puts their voice wherever they want to be in a matter of seconds.

Teletalk Systems are the most modern, fastest selling intercommunication systems on the market today. They can be supplied to fit the exact needs of either large or small offices and plants. Teletalk is easy to install . . . operates directly from the light circuit.

Technical information on all models, their application and installation, can be secured by referring to Sweet's Architectural Catalog, by conferring with any Graybar Electric House, or by writing to us.

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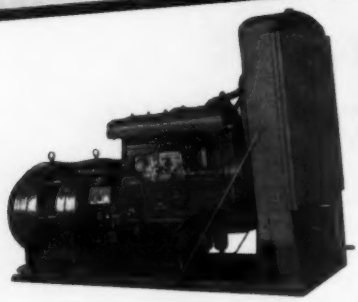

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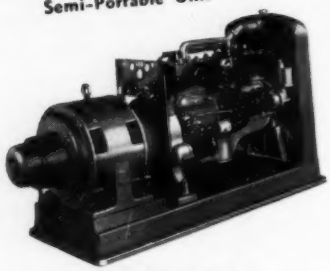
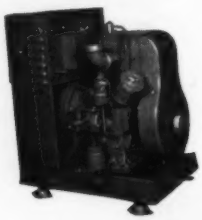


30 KW Unit in service at West Point

15 KW 4-Wheel Trailer Unit



1½ KW Kerosene Unit, Air-cooled

5 KW Portable with Carrying Handles and Skids

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UNITED STATES MOTORS CORP. OSHKOSH, WIS.

U.S. Electric Plants

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Training the Signalman

(Continued from page 78)

safeguarding military information and the organization of the Signal Corps and its relation to the other arms and services of the Army. By actual physical contact, he is taught the nimble tricks which the Japanese call jiu-jitsu or judo but which we call "unarmed defense."

He must qualify with the rifle at least as a marksman before he can move on from Fort Monmouth. Moreover, he is taught to be familiar with and often fires the carbine, the submachinegun and the .45 automatic pistol. He is exposed to all the sounds of actual battle and to close overhead machinegun fire and adjacent bursting bombs on the infiltration course, where he is required to crawl on his stomach within inches of the ground, under barbed wire, while machinegun bullets whistle harmlessly overhead. Booby traps and grenades are made familiar to him.

Since the territory adjacent to Fort Monmouth is wooded and open country, it is particularly suited for the instruction of trainees in the principles of skirmishing, scouting and patrolling, anti-mechanized defense, construction of road blocks and obstacles, and also the methods of camouflage, cover and concealment. For these last purposes, use is made of the new reversible camouflage suits supplied by the Corps of Engineers. At the same time they are instructed to make the utmost possible use of natural camouflage. Bivouacs of several days' duration are held periodically during the trainee's stay at Fort Monmouth. These field problems cover such items as march hygiene discipline, entering a wooded area, approaching machinegun nests, crossing barbed wire, methods of crossing roads and streams, approaching enemy trenches, and street fighting. A complete model of a German village has been built to give street fighting an earnest note of realism.

On completion of an eight and one-half mile hike to the bivouac area, the troops are skilled in field sanitation and personal protection by actually having the opportunity of inspecting various country fair type exhibits. In one section, they will find a complete demonstration of sanitation precautions to be observed in the field. In another exhibit, they will find actual foxholes, slit

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ELIMINATE *Excess Moisture in Cables, Coils, Relays with* WATER SORBER

Protects switchboards and control rooms from excess moisture. Keeps cables, protector coils and cut-off relays trouble-free. Prevents voltage leakage. Reduces maintenance and repair costs.

Water-Sorber is a compact, handy dehumidifier. Patented, dehydrating chemical cubes absorb excess moisture in the air. Requires no care except occasional refill of chemical.

Water-Sorbers are available in a number of sizes and models to provide low-cost humidity control. Used by telephone exchanges throughout the country. Designed by experienced air-conditioning engineers.

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BUCKINGHAM'S SAFETY STRAP
with tested forged Snaps and Buckles.
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BUCKINGHAM'S SAFETY BELT
Made to Federal Specifications KK-B-151

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Signal Corps Photo

SAFETY PIKE POLES

Like so many other essentials, these common place devices may not play a very *dramatic* part in the war effort, but they do lend a lot of support to the men of the Signal Corps. In both training and combat areas, they help to get the messages through.

Their functions are no different than they have been for years in the service of the telephone industry and we are proud of the fact that their performance has been o.k. as expected.

CHANCE CABLE CARS

Our present objective is to keep the Signal Corps supplied with the best Pike Poles, Cable Cars, Cable Rings, Anchors, Wrenches, Tools, etc., that we are capable of making. Our objective for the future will be to continue production of this equipment and we hope that the men of the Signal Corps will remember the fine service this equipment has rendered when things are back to normal and they become the men who influence the purchase of equipment for the nation's telephone, telegraph, and power companies.

NO-TANGLE PACKED CABLE RINGS

THIMBLEYE ANCHOR RODS

STEEL EXPANDING ANCHORS

These items and many others usable in the construction of communication lines are still available for all essential expansion and maintenance. For complete information on a wide variety of anchors, line construction tools, cable rings, cable cars, and other equipment, consult your A. B. Chance Co. catalog of Pole Line Equipment.

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trenches, and various items of equipment camouflaged. In completion of the instruction, the trainees make camp and bivouac for several days. In the forest, far from the comfortable camp site, the signal man becomes accustomed to night noises, the use of his compass and maps, the ways and means of existing on little food, little water, and with little company.

The morale factor is by no means ignored. A series of orientation lectures and accompanying films drive home forcefully to the Signal Corps soldier the reasons for his call to service and why he fights for freedom. We strive to inculcate in him loyalty and honor for the Signal Corps, the Army, and for America. The American soldier is reminded that he is being supplied with the best training and best equipment money can buy. Recreational and religious facilities also play a big part in maintaining the excellent morale which exists at Fort Monmouth.

When, despite the confusion and peril of warfare, the message does get through, it is not accidental nor providential. Success in establishing and maintaining communications in modern warfare is directly proportional to the amount and caliber of training received by signal personnel. The Eastern Signal Corps Training Center at Fort Monmouth demands of its officers and men complete and unequivocal attention to duty because we have proof enough in lost battles and conquered nations that total preparation is the only course in total war.

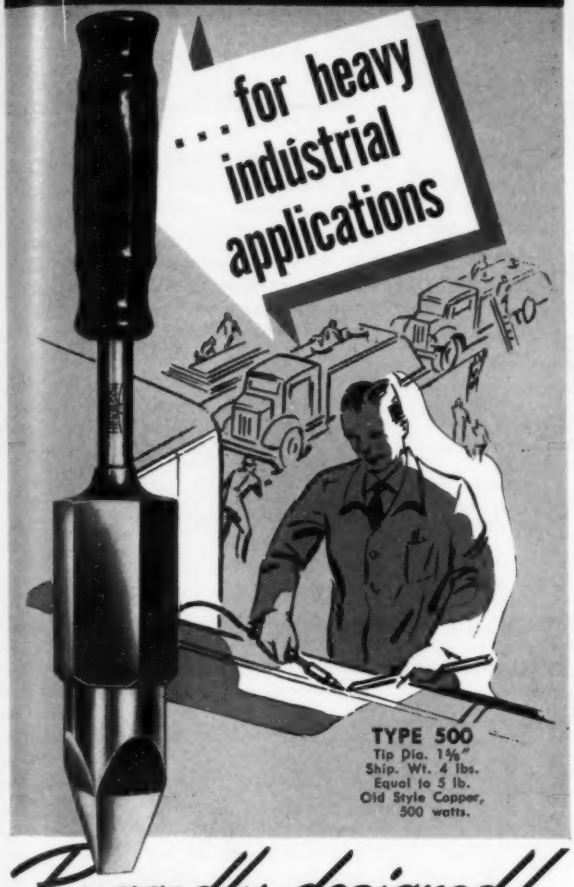
V V

Purely Coincidental

During prohibition, several Signal Corps soldiers at a midwest Army post were sent one afternoon to install a telephone in a non-commissioned officer's quarters. The lady of the house was just leaving, but informed them where the telephone should be installed and stated that there was some home brew in the ice box and they were at liberty to refresh themselves when they had finished their work, since it was a hot day. It seems the soldiers did refresh themselves frequently and, though they called the wire chief and the installation tested O.K., when the old sergeant returned to his quarters that night, he found his new telephone neatly installed in the middle of the screen door.

Buy War Bonds

HEXACON ELECTRIC SOLDERING IRONS



Ruggedly designed!

There's a HEXACON unit to meet all requirements—heavy duty types for broader coverage, lighter precision types for small detail, hatchet types for hard-to-get-at locations. All embody the same high quality of workmanship and materials, and the extra advantage-features of construction and design. Hexagon-shaped barrels prevent rolling and protect against mechanical damage. Can be held in vice for tip replacement without denting or injuring element. High heat alloy core resists scale and prolongs life of the element.

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Descriptive bulletins, describing the complete line of HEXACON electric soldering irons, will be sent on request.

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LET'ER BLOW! --those lines are Amertel

THE extra strength in AMERTEL High Tensile Wires saves maintenance men a lot of worry. For these tough wires—AMERTEL-85 and AMERTEL-135—have the stamina to withstand the strain of heavy wind and ice loads. That means greater freedom from breakdowns that might hamper service vital to the war effort.

AMERTEL Wires save in many ways. They reduce construction time. The longer spans made possible by their extra strength mean fewer poles, less hauling, less digging and less connecting. And this all adds up to marked savings in much-needed man-power and materials, without sacrifice of electrical efficiency.

ALL AMERTEL WIRES — including "EBB", "BB" and "Steel" grades—as well as AMERSTRAND Steel Strand, are produced to a high standard of "Controlled Quality". Every production step—from ore to finished product—is under strict control and experienced supervision. The zinc coating is applied by a special galvanizing process which offers maximum protection against corrosion.

These tags are placed for your protection on every coil of AMERTEL Telephone and Telegraph Wire and AMERSTRAND Steel Strand. They are your assurance of highest quality.

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Time saved in the Battle of Production shortens the days to Victory . . . and "Yankee" Fine Mechanics' Tools save time. A minute here and a half-minute there seem unimportant in themselves. Multiplied by the thousands of "Yankee" Tools in service, they total hundreds of man-hours. . . . For nearly half a century, "Yankee" on tools has been the mark of ingenious and dependable performance — of faster and easier work on countless jobs. Safeguard your "Yankee" Tools. They are weapons of war and must be treated right. And when they again become the tools of peace, you will find them immediately useful for your post-war needs.

Order from your supply house, or write North Bros. Mfg. Co., Dept. T-1243, Phila., Pa. Furnish priority ratings whenever possible. Every effort will be made to fill your orders.

"YANKEE" TOOLS

make good mechanics better

North Bros. Mfg. Co., Phila. 33, U. S. A.

Established 1880

Engineering History

(Concluded from page 92)

with the First Service Command, contributing his store of communication knowledge to the war program.

When we review the records and achievements of these old-time Signal Corps engineers, we are reminded of the parable on the engineer which is somewhat as follows: Once upon a time, it seemed a Signal Corps engineer died and went to Heaven, but was told there that he could not come in, but should go to hell. This sounded familiar to the engineer for he had often been told this through life. He did not argue and asked only whether he could draw per diem expenses for the first 30 days and upon advice that he could not, he journeyed below.

After a few months, St. Peter became worried since many who had trod the golden stairs were requesting transfers to the regions below. He then dispatched a retired army chaplain to investigate and upon his return, the following report was submitted in quadruplicate: The difficulty is all due to that Signal Corps engineer whom you told to go to hell. He has harnessed the fiery furnace in order to generate power. He has air conditioned and cooled the entire place. Gentle breezes and showers have turned hot sands into cool green pastures. The telephone system is a marvel and no poles mar the beauty of streets as all lines are in underground conduit. This telephone system is unique in that the busy signal is never heard. Wrong numbers are impossible and instead of long jingling bells, a sound not unlike ice tingling in a glass gives warning that a friend is calling. In fact, that Signal Corps engineer has gone through hell and made it a wonderful place to live.

We now have an idea where the popular saying, "the impossible takes just a little longer" originated. The Signal Corps civilian engineers have never been found lacking when a special effort is required to "get the message through"—and this applies to all of our wars, past, present and future.

V V

Admiral Farragut commended the Army Signal Corps for its efficiency in communication during the battle of Mobile Bay.

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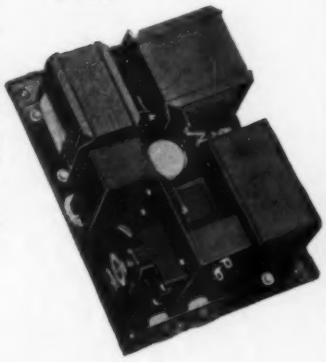
OUTPUT CAPACITY 7½ watts to 40/50 watts.



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Extra tough outer braid prolongs the serviceability of LENZ Desk Stand Cords. The sturdy tinsel conductors aid in the improved transmission. LENZ method of twisting insures uniformity and protection against kinking. Lengthen the service of your Desk Stands today with modern LENZ Desk Stand Cords.

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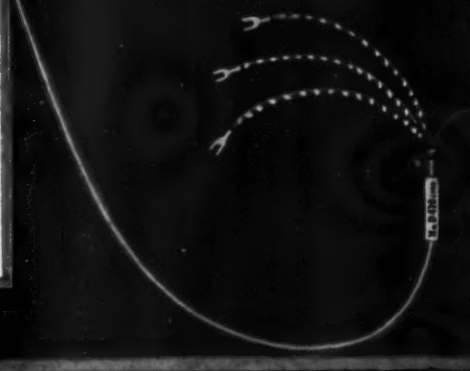

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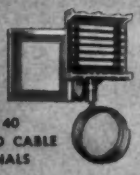
"IN BUSINESS SINCE 1904"

TYPE 15 SUBSTATION PROTECTOR



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IN WAR OR PEACE— FOR INDOOR OR OUTDOOR APPLICATION

Your Best Bet for Protection

TYPE 20 SUBSTATION PROTECTOR

TYPE 35 PROTECTED CABLE TERMINALS

Throughout the Independent telephone industry Automatic Electric protection equipment is recognized for its safety, dependability and economy. This is because these devices are engineered to provide these five specific advantages:

(1) Fast, convenient mounting. (2) Lightweight design. (3) Weatherproof construction. (4) Maximum protection at every possible danger point. (5) Dependable, lasting service without attention.

Automatic Electric Protective Devices have the Type 2105 Discharge Block as standard equipment. This unique development assures positive and unequalled protection against high voltages; and, through its automatic resetting feature, provides continuous service and saves maintenance time.

Complete information on the Automatic Electric line of protection equipment is contained in Catalog 4068-A. Write for your copy.

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Canadian Cable

(Concluded from page 50)

Canada, payed out the cable from flat cars and laid it in position at the foot of the poles. This cable was then lashed to the messenger strand by means of a cable-lashing machine which was pulled by a railway motor car. The Signal Corps purchased and had in operation a large number of such motor cars which were used to transport men and materials for construction assignments.

Work progressed very satisfactorily on the project once full-scale construction began in October, 1942. However, many obstacles, such as scarcity of materials and shipping difficulties, threatened many times to delay the work. The Bell telephone company and Western Union construction crews were placing and splicing cable at the rate of three to five miles a day and it became very difficult to maintain a sufficient flow of materials. However, after a few minor interruptions the cable was all placed and spliced by January, 1943.

The Western Electric Co. had installers in the repeater stations in November, 1942, and equipment was beginning to arrive about that time. Scarcity of shipping facilities also caused considerable delay in arrival of equipment. However, once all the equipment had arrived on the job, installation work progressed rapidly and all circuits had been cut into service by April, 1943.

The Signal Corps subsequently has constructed the open wire portion of the project and numerous small local loops and extensions. With the exception of a portion of one open wire line, which will be finished during December of this year, the whole project has now been completed. The cable held up with no trouble this past spring under some very severe sleet storms which disrupted service for long periods on other communication facilities. On the whole, it was a big job performed under difficult circumstances and could have been accomplished only by hard work and whole-hearted cooperation between the Army Service Forces, commercial companies who were contractors on the job, and the Canadian government which also gave valuable assistance.

THE SIGNAL CORPS GETS THE MESSAGE THROUGH

BEN-HUR TRAILER ENGINEERING applied to your post-war plans may show you, too, new uses for handy trailer units—to move tools to the job, to mount vital machine units, carry supplies and materials, or for mobile service units.

We're entering into contract negotiations now for the development of standard or special trailer units. Send your inquiry at once, that the time-consuming preliminary details can be out of the way—ready for swift completion later.

Take advantage of Ben-Hur's experience in trailer design and engineering to help YOU to new progress in post-war business planning.

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• *Why dig holes by hand* or use expensive earth boring machines when you can use K-M Portable Earth Drills instead, saving time in setting, straightening, and lining your Telephone poles.

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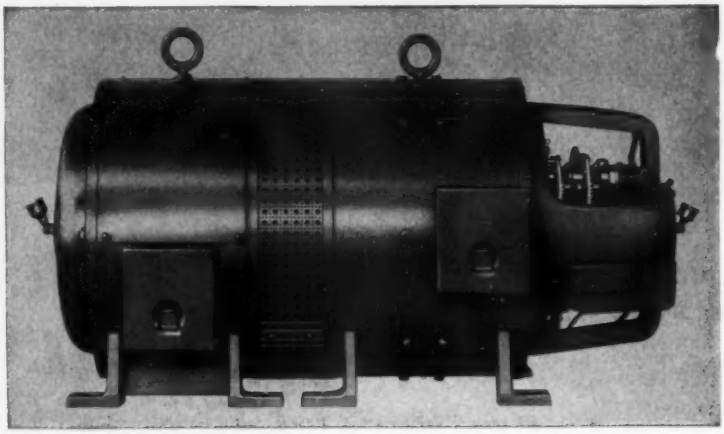

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Telephone Exchange Batteries

Let us show you how the Diverter Pole Generator has fully solved the charging problems of hundreds of users, with appreciable reduction in power costs, materially increased battery life, and with exchange voltage held more constant than ever before.

The Diverter Pole Generator follows the exchange load, leaving the full battery capacity available for emergency service.

Ask for Bulletins.

The Electric Products Co.
CLEVELAND, OHIO
1739 Clarkstone Road
New York Office 126 Liberty Street

Naples Telephone System Crippled By Nazis

The complete crippling by the Nazis of the telephone facilities of Naples, Italy, was reported by the Allied Military Government officials to Secretary of the Treasury Morgenthau for inclusion in the latter's report to President Roosevelt.

According to the information supplied to Mr. Morgenthau by the AMG, the Germans before retreating from Naples blasted the telephone exchanges, severed lines, and dynamited power plants which fed energy to the city's communications system. However, two exchanges were overlooked, with the result that service was restored for use by the Army within 10 days.

The report of the extent of the destruction by the Germans of communications along their line of retreat points up the significant task confronting American telephone and communications specialists and engineers in rebuilding these vital links in captured territory.

Certainly, if the destruction in Naples is any example of the lengths to which the Germans will go in paralyzing communications in evacuated cities, the demands on American production of replacement equipment, even for limited temporary service, will be very greatly expanded.

V V

Signal Corps Officers Meet With Manufacturers

At the invitation of Maj. Gen. H. C. Ingles, Chief Signal Officer, 25 manufacturers of Signal Corps equipment attended an all-day conference at The Pentagon on November 10 to discuss current requirements, the future production program and other related matters. After explaining the purpose of the meeting and alluding to some of the general problems, General Ingles turned the meeting over to Maj. Gen. William H. Harrison, chief, Procurement and Distribution Service, for a more detailed discussion of specific questions.

General Ingles entertained the manufacturers at a luncheon which was attended by Lt. Gen. Brehon B. Somervell, commanding general, Army Service Forces; Maj. Gen. W. D. Styer, chief of staff, Army Service Forces, and Maj. Gen. Leroy Lutes, director of planning, Army Service Forces.

V V

The Secretary of War in President Buchanan's cabinet asked for and got, an initial appropriation of $2,000 for the procurement of field signaling apparatus.

Why

G-E TELEPHONE WIRE

Gives Trouble-Free Service

Because it is fabricated to rigid specifications, G-E telephone wire has won wide acceptance throughout the industry. Using an alloy-coated copper, it is easy to bend and form, making connections simple and easy. Outside wire has an insulation designed for tight adherence to the copper. It has a heavy braid with mica-flake finish and tracers for quick identification. The insulation on inside telephone wire permits free stripping. For additional information write to Section A1236-4, Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

GENERAL ELECTRIC

QUEEN INSTRUMENTS FOR THE TELEPHONE INDUSTRY AND THE SIGNAL CORPS

E-3108C

E-1022C

E-1645-B

E-3108C—"Queen" Dial Decade Set

A compact portable bridge set, complete with contained galvanometer and battery, for the measurement of resistances and the location of line and cable faults.

The ratio arms are controlled by a single dial.

Seven multipliers of 0.001—0.01—0.1—1—10—100—1000, accurate to 0.5% and four resistors for Murray Loop Test.

Rheostat comprises four decades 10x1—10x10—10x100—9x1000 and infinity. Rheostat coils accurate to 1/10% and bridge coils to 1/20%.

Resistors are wound non-inductively on non-metal spools.

E-1022C—"Queen" Dial Decade Wheatstone Bridge

Rheostat has four decades 10 (1+10+100+1000) and a single dial control for ratio arms.

Seven multipliers 0.001—0.01—0.1—1—10—100—1000. Adjusted to 1/20% in bridge arms and 1/10% in rheostat.

This bridge offers a wide range of usefulness. It is a convenient form for conductivity measurements.

Coils are bifilar wound on bakelite spools.

E-1645-B—Four Section Resistance Unit

Four coil resistance box. Bifilar wound on bakelite spools.

Accuracy 0.1%.

Mounted in bakelite case measuring 6" x 2½" x 1".

Can be supplied in combinations of four (1-2-2-5: 10-20-20-50, and so on) up to total of 10,000 ohms.

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Consolidated engineers will design transformers for special applications or will build to *your* specifications.

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Corps Uses Toothpaste Tubes for Solder

When the supply of wiping solder ran low in Iceland not so long ago, Signal Corps technicians there used melted toothpaste tubes which they salvaged from their buddies in order not to delay the construction of communication facilities. This was the story brought back to the United State by Lt. Heliodor A. Michalowski, Signal Corps, who spent more than a year in Iceland, having arrived with the first American troops.

Solder, molten tin and lead, is used to connect electrical circuits in fragile radio wiring as well as wrist-thick telephone cables. It was to splice a cable line that the toothpaste tubes were used. This permitted the signalmen to continue construction. The next convoy brought additional supplies of solder.

Laying cable in the lava-hardened earth of Iceland was no easy job, the lieutenant emphasized. "Ditches had to be dug with pneumatic drills and, in many cases, we had to blast in order to loosen the ground. Because of the rough and frozen terrain, we couldn't use the regular Signal Corps plow to bury the cable. So we constructed two heavy ones that stood the punishment.

"Even in setting up overhead lines," the Signal Corps officer explained, "we had to use air hammers to dig post holes."

A fire at one of the hospitals on the island destroyed wire communications, he related. "In less than an hour, our mobile switchboard exchange moved into the area and restored wire communications.

"Signal communications — both wire and radio—played an important part during air raid warning alarms. Weather forecasts were supplied on our wire lines to the Air Corps.

"During the entire period I was there, I witnessed three phases of signal communications. During the first phase, field wire lines were constructed. As equipment and supplies were received, we entered the second phase—installing more permanent facilities. At the end of this phase, all signal units started a program to pick up field wire lines and rubber cable installed during the first phase. This wire was serviced and returned to the signal depot to be re-used during tactical problems by the Infantry and the Artillery.

"Our job from then on was maintenance, which was very small. Preventive maintenance was practiced continuously."

V V

The Signal Corps is half as old as our nation.

SAVE WIRE
SAVE TIME
SAVE TROUBLE

The Nicopress method creates a joint as strong as, or stronger than, the line itself. There's a complete line of Nicopress sleeves for repairs, dead-ends, take-offs, splices, and tools for each. These, plus many other Nicopress specialties for telephone lines, are famous for service.

THE NATIONAL TELEPHONE SUPPLY CO.

Repair with NICOPRESS SLEEVES and Maintain Top Service!

Save—but don't save at the cost of service. People nowadays are so dependent on telephone service a life may well hang on those slender wires strung over the countryside. And, proper maintenance is so simple with Nicopress repair sleeves there's no need to risk old, noisy joints and possible line failure.

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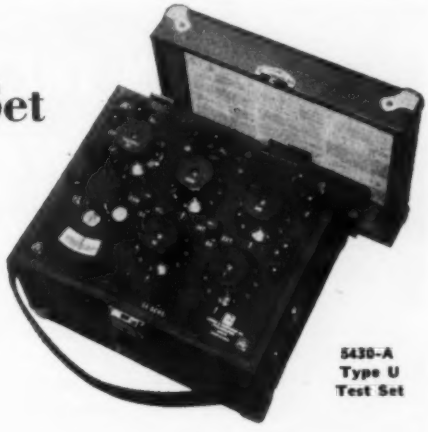
Accurate Fault-Locating soon pays cost of Type U Test Set



5430-A Type U Test Set

An unusually strenuous job of trouble-clearing is faced by one of the large Canadian telegraph and telephone companies whenever a fault develops in any of their numerous submarine cables. These cables lie in waters which are icy, notoriously rough, and full of fast-running cross-currents which whip the cable back and forth whenever it leaves the bottom.

The time, cost and hazard of these cable-clearing operations are reduced appreciably by the accuracy of the L&N test sets used to locate the faults. By helping send boats (or the cable-ship) to the correct spot, the sheer accuracy of the test instrument often enables it to save, on one repair job, more out-of-pocket cash than is represented by its own cost.

One of this telephone company's favorite instruments is our Type U Test Set; a Wheatstone bridge made especially for telephone trouble-shooting.

A single switch on this instrument changes all internal connections to either the Murray, Varley or Hilborn loop, or to the measurement of circuit resistance. Switches are big and well apart, so that the user can keep his gloves on. Loop diagrams, and directions for figuring distance by means of each loop, are in lid of set. For further details, ask for Catalog E-53-441(1).

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MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

Jrl Ad E-53-441(5)

Cable Plowing In Alaska

(Concluded from page 53)

been used to dig a trench. Also some light cables have been buried with a plow.

In many places, however, Alaska IS rocky and DOES have unplowable mountains and gorges of all sizes. Then picks and shovels go into action. Sometimes even hand digging is not practical, and the cable simply must be laid on the ground. A peculiarity of military cable systems is that the routes as often as not lead to promontories and other places difficult to access. Usually there is only one logical route, and it is a tough one. And there is always an urgent service date.

Miles of cable have been hand-carried into place. At a 20-foot interval between men, a 3,000-foot reel requires 150 porters. A line of that length has a tendency to stretch out and close up like a parade. Usually the head tends to go faster than the tail. When a hill is crossed the men going down forget that the men going up can't go so easily. If these differences in gait are not kept within closely-supervised limits the lead sheath can literally be torn apart, and that has actually happened.

This mechanical rhinoceros is the Alaska version of a rooter. Tooth is mounted directly on bulldozer frame of D-8 tractor.

In a land of snow, wind, rain and little sunshine, to get results, men must work in the rain, snow, wind and gloom. The Signal Corps men and officers of the Alaska Communication System are constructing hundreds of miles of cable plant, buried and aerial, in the finest traditions of the Signal Corps and the telephone industry. Each day sees new plant completed and more and more messages going through in any kind of weather.

AS SEEN IN THE SIGNAL CORPS BOOTH
"BACK THE ATTACK" ARMY SHOW

Washington, D. C., Sept., 1943

Just consider for a moment the terrific responsibility of the Signal Corps in this global war. Communications must be established quickly. Communications must be trouble-free because faulty communications may spell the difference between victory and defeat in battle.

Because Protek-Sorb Desiccant permits the cable splicer to make splices faster and safer . . . because its free-flowing qualities and higher capacity assure a splice that returns to normal insulation resistance quicker and because the splice *stays* dry . . . Protek-Sorb Desiccant helps establish communications with SPEED, SAFETY, CONFIDENCE.

You can obtain Protek-Sorb Desiccant for your cable-splicing requirements from your telephone equipment supplier and rid yourself of the dangers and lost time associated with drying cable splices by outdated methods.

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IDENTIFIES THE QUALITY ON EVERY ITEM

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Discusses the entire industry!

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By ARTHUR L. ALBERT
Professor of Communication Engineering, Oregon State College

A study of the various specialized phases of electrical communication as related to the usages of modern communication systems. This book presents not only theory but a discussion of the entire industry. Although not highly mathematical, the treatment is exact, up-to-date, and in accord with high engineering standards. The communication engineer will find this book a valuable addition to his working reference library. Popularity of the book required a second printing, and material was revised to include latest information.

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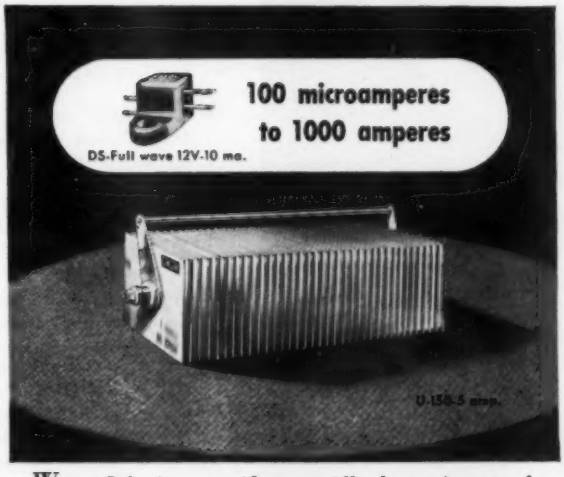

WITH Selenium rectifiers rapidly becoming standard throughout American industry, today's engineers count on Selenium Corporation for the most complete line of selenium rectifiers. Units with these important advantages: 1. Permanent characteristics; 2. Temperature range from −50° C to +75° C; 3. Unlimited life; 4. Maximum efficiency per unit wt.; 5. Weather resistant; 6. Special types available.

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WACs Overseas Plug for Complete Victory

An American general lifts a telephone at Allied headquarters in the Mediterranean area and speaks:

"Gypsy Lee 123."

He's placing a telephone call upon which the lives and military fortunes of thousands of fighting men may depend. His manner is stern, intent. Farthest from his mind are the Broadway stage and Gypsy Rose Lee.

But a smile may appear for an instant on the face of the WAC operator who took the call at the switchboard. For Gypsy Lee is the name of a telephone exchange within the network connected to Allied headquarters.

Names of the exchanges are fantastic concoctions usually suggested by the various combat or operating units in a spirit of fun. The names are changed frequently. Some used in the past include Hot Box, Frock Coat, Auntie, Rattlesnake, Frantic, Mildew, Radish, and of course, Gypsy Lee.

You probably have read recently what a grand job the WACs are doing overseas as telephone operators. Army men continue to heap praise upon them. This praise confirms what telephone people have known for a long time — that women can operate switchboards better than men.

The international switchboard at Allied headquarters is one of the busiest, and certainly one of the most important, in the world. Since the WACs arrived and replaced men at the board, service has improved 100 per cent, says General W. B. Smith, chief of staff at headquarters.

In performing this vital service the WACs are exemplifying the great record being made by telephone women in thousands of other areas where the war's progress depends on good telephone service. Through the circuits of the North African system are transmitted important instructions and commands which move troops and ships throughout the Mediterranean area.

In handling these calls, the WACs are "following through" on the work of hundreds of thousands of telephone women at home who have helped to put the men and materials in striking distance of the enemy.

The Allied switchboard is so strategically essential that its location is a strict military secret and is subject to frequent moving. Operators cannot mention its whereabouts. Buildings which have housed it from time to time are camouflaged and protected against bombing.

It's an exciting and unusual switchboard, too, because it serves people who speak many different languages. The WAC operators are becoming skilled linguists. Those who were language experts before their enlistments serve as interpreters.

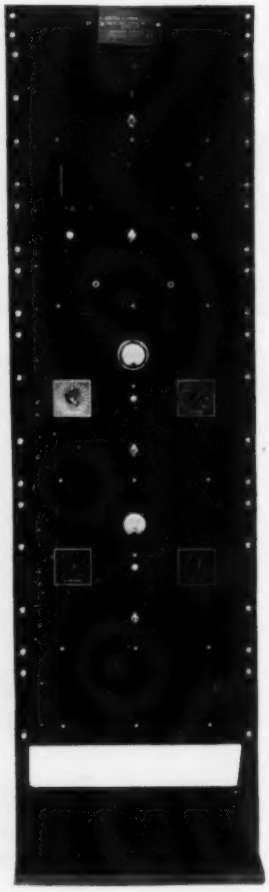
When the two people on the line aren't able to speak the same language, the interpreter sits in on the conversation at a third telephone. She not only interprets the words of each person to the other, but also the shades of meaning as indicated by voice inflections, emphasis, and the expressions peculiar to certain dialects.

V V

Plans Monument To Filipino Army

A tribute to soldiers of the Philippine Islands is planned by Pfc. Numeriano D. Davin, a native Filipino, who is training at the Western Signal Corps Training Center at Camp Kohler, Calif. He has willed $500 in war bonds to his home town, Santa Maria, towards erecting a monument in honor of his countrymen in the Filipino army.

Private Davin, who has no doubt the Japanese will be ousted from the islands, says he will deliver the bonds personally if he is alive when the war ends. He came to the United States in 1929.



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Harding Universal

TELEPHONE REPEATER

- Provides *automatic* compensation for line losses.
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- Does away with repeated, laborious manual re-balancing, required in conventional type of telephone repeater to match changes in line impedance due to varying load, weather, or other conditions.
- Available in various sizes and models, each serving a definite purpose. For circuits of commercial telephone companies, railroads, pipe lines, power companies and other utilities employing independent communication facilities. Quickly, easily installed.

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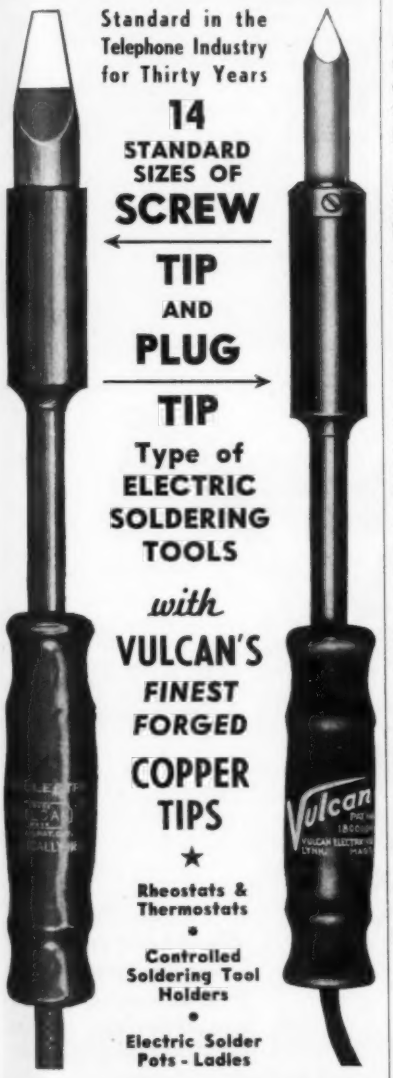


VULCAN ELECTRIC CO.
DANVERS, MASSACHUSETTS

Communications Essential To Military Unity

The importance of communications to the war effort was recognized by Maj. Gen. Harry C. Ingles, Chief Signal Officer of the U. S. Army, when he said: "I know of no other single activity which is so much a part of all military activity. It is, in a sense, the warp of the whole military fabric, serving every commander and every soldier, and holding them together in a state of unity."

Domestic Wire Communications Of Army Being Consolidated

Domestic wire communications of the Army are being consolidated into a single system to effect coordination and conservation of critical materials, wire facilities and manpower, the War Department announced recently.

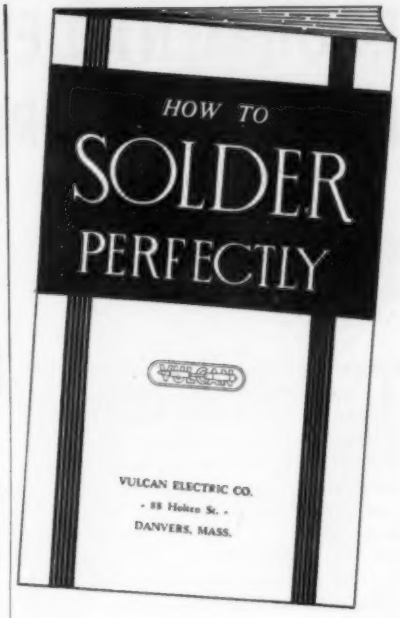
The new system is the just-created Army Command and Administrative Network, Army Service Forces, and is being set up under supervision of the Army Communication Service of the Signal Corps, of which Brig. Gen. Frank E. Stoner is chief.

Many separate communications now operated by various branches of the Army will be eliminated under the change-over which, when completed, will have in operation 25 message centers — including Army Service Commands — and 15 or more additional points close to important military installations.

The plan includes eventual abandonment of the Army's radio network in the continental United States — the present traffic being diverted to the network — but radio circuits for overseas communications will be continued.

Certain communications systems of Army branches which require specialized traffic handling, such as the Army Air Forces, will be continued, but it is planned to connect the new network with specialized nets of these other branches so that traffic can be transferred.

Although the consolidated message centers are to be operated by the Signal Corps, independent centers at other points will be combined with the branch of the Army which has the predominant activities operating at that point. Out of the main message centers, circuits will radiate to sub-centers located near Army facilities which will transmit and receive traffic. Trunk circuits will connect the various message centers with each other and specialized relay equipment is to be installed to speed operations.



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(Underwriters Approved)

VULCAN ELECTRIC CO.
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....., 1943

Gentlemen:
Please send to me, without obligation, your booklet, "How to Solder Perfectly."

Name.....

Company.....

City..... State.....

EQUIPMENT DEVELOPMENT IN SIGNAL CORPS

By WALTER R. TAYLOR
Engineer, 4th Service Command
Atlanta, Ga.

THE development of the Signal Corps communication equipment began during and following the Spanish-American War, confined, though, principally to the development of field equipment, that is, equipment made in combination to operate by telegraph, telephone or buzzer and designed in compact form, light in structure, yet built of such durable material as would withstand mud, sleet and rain as met in field operations.

The convenience of telephone service to the individual in those days meant little to the Army man, and but few telephones were required by the government to conduct its interior post and coast defense activities. The telephones, where used, were connected on belt circuits, sometimes as many as 10 telephones were connected to one line, using a series of ringing code signals to indicate the party called. The telephones used were exclusively of the American Bell commercial wall type. It being the rule of the company at that time not to sell their transmitters and receivers, it was necessary for the government to rent them.

One telephone, somewhat centrally located in an Army post and connected with the nearby commercial exchange, served an entire garrison. This inconvenience for obtaining commercial communication was not only the practice at that time, but was true as late as 1912.

In the year 1900 the Signal Corps was charged with furnishing of telephone service to the Army, that is, service for the conduct of Army activities not to include exchange and long distance service. This meant, of course, that telephone systems at permanent posts and stations of the Army where government-owned systems were concerned, were under the administration of the Signal Corps. It was about this time that the practice of hiring civilian technical engineers and employes was initiated. This enabled the Signal Corps to do its own engineering and installing. It was from this time on that the Signal Corps actually began its development of coast defense and interior post telephone equipment.

This equipment was placed in two classes, the one being known in the service as fire-control equipment and the other as post or administrative telephone equipment, the former being of special design to meet coast artillery requirements with the construction stability to withstand gun fire concussion, while the latter was designed not dissimilar to commercial instruments, the principal purpose being one of simplicity and intended only for the short circuits of the intrapost service.

There was no object at the time for perfecting these telephones and switchboard for long distance transmission. The A.T.&T. Co. and associated Bell companies objected to the government

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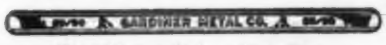

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connecting its local exchanges to their systems, using for their objection the non-standard equipment used by the government, consequently, it was the practice for the government to install and own its system in Army posts, though without access to commercial circuits. Any long distance or commercial exchange service desired might be had from the one commercial telephone located in some part of the government reservation.

In some few posts where individuals of the reservation desired commercial service, and where the revenue to the company was such as to justify a commercial PBX, the company installed its own equipment in duplication of the government system, placing their switchboard by the side of the government switchboard so that the government operator might handle the service of both switchboards.

One of the greatest difficulties the Signal Corps faced in the development of its telephone equipment was that of its manufacture. The regulations in government departments require that bids be awarded to the lowest bidder. In advertising for bids for the manufacture of this Signal Corps telephone equipment, it was almost invariably the small manufacturer that made the low bid, and consequently, he was awarded the contract. It might therefore be found with few exceptions that the government telephone systems installed during the years 1900 to 1910 were either of the Sumter, Lambert-Schmidt or the Dean manufacture, all of them having long ago gone out of business leaving to the Signal Corps their standard parts, such as transmitters, receivers, jacks, plugs and drops that could be replaced when defective only with considerable difficulty.

Captured Japanese field telephone. It is comparable to the EE-8.

It was about 1910 when the Signal Corps began to award contracts to substantial telephone manufacturers, and it was then that the first lamp signal switchboard was placed in government service, incidentally the first system of modern type and capable of handling long distance messages. The Signal Corps had no difficulty after that time in contracting with Independent telephone companies for trunk circuit connections. The Bell companies, however, continued to oppose tying in to these government systems. To convince the Bell companies of the virtue of these government systems their engineers were invited, in company with the engineers of the Signal Corps, to make a comparison service transmission test between a system of the Signal Corps and a system of the company. This being agreed upon, and as a matter of convenience to both the Signal Corps and the company, Fort Myer, Va., where both the telephone company and the Signal Corps had their respective systems in operation, was selected as the place for making the test. The test was made in 1912 and the Signal Corps system met every condition in a manner expected of it.

Since 1912, that is, from the time that the government systems were given access to commercial connections, Signal Corps equipment development has progressed more rapidly, the object being to provide, install and operate these government plants in a manner creditable to the service required of them.

V V

The Weather Bureau was created by the Army as a part of the Signal Corps under General Myer in 1870.

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Col. Ira H. Treest of Signal Corps Retires

[EDITOR'S NOTE: *The following is an address delivered by Brig. Gen. F. E. Stoner, Chief of Army Communications Service, Office of the Chief Signal Officer, on the retirement of Col. Ira H. Treest in Washington, D. C., November 23. General Stoner's address serves to give a full account of the service of Colonel Treest, a former telephone man, in the Signal Corps.*]

"WE ARE here to honor a distinguished military career. I have no doubt that if I stopped right here, Ira Treest would consider the subject well covered—that for him the mere acknowledgment of a job well done is sufficient. But we who have served with him know there is more to it than that.

"We know that 26 years of efficient, progressive service are not so lightly

COL. IRA H. TREEST

dismissed. We know that while the career itself is ending, the results of his work and the impact of his personality will continue to be felt by the Signal Corps long after his retirement.

"The country was engaged in another war on July 18, 1917, when young Ira H. Treest gave up a promising career with the Pacific Telephone & Telegraph Co. in San Francisco to do his share in the Army's vital job of communications.

"Commissioned a first lieutenant in the reserve corps by Gen. George O. Squier, then Chief Signal Officer, Ira Treest served more than a year with the 8th Field Signal Battalion, then went overseas with the 115th Field Signal Battalion.

"He was still overseas when the war ended, but for Ira Treest the task was

"American" Maintenance Bodies Successfully Meet the Tough Signal Corps Assignments . . .

Practically all equipment that has gone to the various war theaters in "Uncle Sam's" service has been put to tests far more severe than any met in normal service at home in peace time.

"American" is proud of the fact that their Maintenance Bodies supplied to the U. S. Signal Corps have successfully met the toughest tests and been of real value in helping the boys in this service overcome many handicaps.

Today "American" is looking ahead and planning to meet the post war demands of the Utilities.

Much time and thought is being given to development and improvement of "American" Equipment and Bodies so that they meet even more fully than in the past, all service needs.

"American" appreciates that the best judges of any equipment are the men who use them so we sincerely invite suggestions.

War emergency production, of course, limits final development and putting into work of the new equipment envisioned. So for the period immediately after the war, "American" plans to take care of your needs by supplying the same fine models as used before, as fast as chassis are available.

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A Selected List of Telephone Books

In this war emergency knowledge is needed to help achieve victory. Technical books and information assume greater importance as a means not only of better fulfilling our niche in the war effort but of self-improvement. From this list of telephone books, with brief statements of their contents, employes may find one or more they will want to secure for study and reference.

• ***How to Build and Repair a Farm Telephone Line*, published by Telephony Publishing Corp.**
Eight-page booklet, unbound, 25 cents per copy to non-subscribers of TELEPHONY; special prices available to subscribers and to anyone ordering 25 or more booklets. This booklet, well-illustrated with photographs and diagrams, tells what was done to place a run-down farm line in good condition to furnish excellent service. The text describes how to attach wire to an insulator, how to attach brackets, how to set a pole, how to string wire, how to make a splice, how to protect telephone line from power line hum, how tree branches touching wires hamper transmission, how to connect drop wire to line wire, how to attach drop wire to house, how to connect house line to telephone, and how to connect the ground rod. The materials needed for a farm line are also listed.

• ***Rural Telephone Trouble*, published by Telephony Publishing Corp.**
Four-page reprint of an article published in TELEPHONY giving 33 magneto telephone and line troubles most commonly encountered, with suggestions as to the most likely cause of each —whether in the telephone set, the protector, the line, or the central office. Cost is 25 cents per copy to non-subscribers of TELEPHONY; special prices available to subscribers and to anyone ordering 25 or more reprints.

• ***What You Should Know About the Signal Corps*, by Harry M. Davis and F. G. Fassett, Jr. (1943)—214 pages, 16 illustrations.....$2.50**
Credit for the excellent communication service that cements America's huge Army into one powerful, smoothworking machine goes to the Signal Corps—which consists of technically-trained men who procure equipment and transmit messages, install Army telephone systems and radio sets as well as repair them when they break down, and operate the more complicated signal communication networks. In addition to the occupations resulting from the job of transmitting messages, the book covers such activities of the Signal Corps as their experiments in meterorology and aviation, and the making of training films and the taking of action pictures in battle, and gives the history of communication in the Signal Corps. This non-technical book is of like interest to civilians or servicemen.

• ***Electrical Fundamentals of Communication*, by Arthur L. Albert (1942) 554 pages.....$3.50**
This book deals with fundamentals of electricity as applied to communication, including telegraphy, telephony, and radio. Contains basic electric circuits and phenomena using illustrations, terminology and problems from communication industry standpoint. Contains tables and 359 excellent drawings; is non-mathematical and clearly written for communication people having little or no college training. Especially suited for use in telephone training courses for new employes. Also valuable for employes who wish to extend their knowledge of electricity. A summary as well as review questions and problems given at end of each chapter.

• ***A Telephone Rate Case*, by Edward D. Smith (1941); 223 pages.....$5.00**
Written simply and clearly by an attorney for a telephone company, this book gives a bird's-eye view of the general rate regulatory background, and then outlines the steps for preparing a telephone rate case. Company executives as well as legal counsel dealing with rate matters will find much valuable and helpful information in the book. There is a comprehensive table of case references.

• ***Soldering for Workshop, Farm and Home*, by John Bonert (1941); 111 pages, 28 illustrations.....$1.25**
Valuable soldering information for telephone plant men, particularly apprentices, is presented in this book written by a telephone man with years of practical experience. The book discusses soft soldering, fluxes, tinning, soldering coppers, wire splices, soldering on lead, closing seams in a split cable sleeve, soldering and sweating with a torch, joints, hard soldering or brazing, construction of a soldering copper holder and pad, etc. No scientific terms or complications have been used in the book, which is intended to help the beginner or to refresh the memory of an experienced worker.

• ***Electrical Communication*, by Arthur L. Albert (1940); 534 pages (second edition).....$5.00**
Presentation of electrical theory of communication, including vacuum tubes, networks, filters, and discussion of entire industry. Various subjects considered as related to one another in modern communication systems. Designed as a college textbook and reference book for those having technical training. Others will find much of value in it, as use of mathematics has been limited but not at a sacrifice of engineering exactness.

• ***Transmission Networks and Wave Filters*, by T. E. Shea (1929); 470 pages.....$6.50**
A specialized book which deals with principles of transmission networks, electric wave filters, and composition of transient waves. It is intended for student engineers or graduate engineers.

• ***Storage Batteries*, by George W. Vinal (1940); 464 pages (third edition).....$5.00**
The physical and chemical facts and theories about storage batteries are summarized and their various applications described in this book. Emphasis is laid on the scientific principles of storage batteries without permitting the text to become too technical. The physical, and chemical properties of the materials used in batteries are discussed as they relate to battery performance, and a general description of manufacturing methods given. Especial attention is directed to the operation and testing of batteries.

• ***Fundamental Electronics and Vacuum Tubes*, by Arthur L. Albert (1938) 422 pages.....$4.50**
The increasing use of vacuum tubes in telephone work makes this non-mathematical book of practical value to persons in engineering and operating branches of telephony. The book discusses the principles of electronics and the theory of vacuum tubes, photocells and copperoxide varistors in telephone circuits and radio. It delves into the theory of these devices and the design and operation of circuits in which they are used.

• ***Electrical Engineers' Handbook*, electric communication and electronics, volume 5, by Harold Pender and Knox McIlwain (1937); 878 pages.....$5.00**
This reference book for communications engineers contains engineering data and formulae concerning modern networks. Discussions are presented of telephone circuits (local, toll and program facilities), radiotelephone systems, and high frequency transmission, profusely illustrated with line drawings, as are the other sections. These sections include acoustics, telegraphy, sound-reproduction systems, facsimile transmission, television, electronic control and navigation equipment.

• ***Communication Engineering*, by W. L. Everitt (1937); 727 pages (second edition).....$5.00**
Book designed for engineers and those with technical training; gives fundamental principles of telephone, telegraph and radio communication without going back to the beginnings of the entire electrical engineering field. Transmission networks and circuits, involving coupled circuits, impedance transformations, equalizers and bridge circuits are treated. Inductive coordination is discussed with the latest theories for minimizing interference. Discussion is given of other links in the circuits which make possible radiotelephony or carrier-current systems, including vacuum tube detectors and amplifiers. Mathematical ideas, beyond calculus, are introduced just before they can be applied.

• ***Inductive Coordination of Electric Power and Communication Circuits*, by Laurence Jay Corbett (1936); 161 pages.....$3.00**
This excellent book discusses the nature of power transmission and of communication transmission, the effect of magnetic and electric induction and various influence factors. Susceptiveness and coupling factors, effects of conductor arrangements, transpositions in power and communication circuits and their coordination, power system wave shape, control of residual voltages and currents and many other phases are discussed. This book should contribute to a fuller understanding by power and communication engineers of each other's problems.

• ***Telecommunications — Economics and Regulation*, by James M. Herring and Gerald C. Gross (1936); 544 pages.....$5.00**
Dealing primarily with the economic and public service aspects of the communications industries, the major purpose of this book is to evaluate existing state and federal regulation in the light of the requirements of national policy, as determined by the present federal administration. The subjects covered include the growth and development of the telegraph industry, submarine telegraphy, the telephone industry, the development and history of radio communication and broadcasting, state and Federal regulation of the communications industries.

• ***Telephone Theory and Practice*, by Kempster B. Miller (1933); 1414 pages.....$15.00**
A set of three volumes, "Theory and Elements" (1930, 468 pages, $5); "Manual Switching and Substation Equipment" (1933, 439 pages, $5); and "Automatic Switching and Auxiliary Equipment" (1933, 494 pages, $5). Volumes may be purchased separately or as a set. This series replaces "American Telephone Practice" by the same author, published early in the century. The set comprises an excellent source of accurate information of entire subject of telephony.

• ***Elements of Utility Rate Determination*, by J. M. Bryant and R. R. Herrmann (1940); 464 pages.....$4.50**
Based on tested and workable methods, this book discusses factors, methods and problems of evaluating public utility property and service for rate-making. The essentials of valuation, depreciation, expense, return, etc., as factors in establishing proper rates for various utility rates are given. Citations presented from background and key cases decided by commissions and courts.

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not finished. Offered a chance to return to America, he wrote to his superiors: 'I wish to remain in the AEF as long as possible.'

"He had his teeth in a job, and the Army was in his blood. Still with the 115th, he applied for a commission in the regular Army. After being commended for his work overseas, he was commissioned in the permanent grade of first lieutenant, and in 1920 was stationed at Camp Alfred Vail, which later became Fort Monmouth.

"There he began the years of peacetime service which were to prove invaluable to the Army when the nation was forced into a new war.

"Several years of service in the Hawaiian Department intervened. Then in 1938, when the United States began to hasten its military preparations, Ira Treest—then a major—was assigned to important duty as umpire of communications during the Third Army Maneuvers.

"He turned in his customary fine performance there, was promoted to lieutenant colonel, and in 1940 became commander of the 54th Signal Battalion in California. Assigned to headquarters, Western Defense Command, he was promoted to full colonel in 1941 and later served as signal officer of the Fourth Army, and of the Western Defense Command.

"Colonel Treest's executive and practical technical experience fitted him ably for new and important duties in Washington when he was assigned early this year as chief of the Communications Engineering Branch of the Army Communications Service.

"It was a big job. The Communications Engineering Branch is responsible for the overall planning for the Army's fixed communications throughout the world, for the integration of existing facilities, for initiating action for the procurement of fixed communications equipment, and for traffic operational procedures and standards. Direction of such complex and varied activities required a tremendous amount of resourcefulness as well as ability.

"But Colonel Treest was a big man. It was typical of his method of operation that he first quietly sized up the situation, then threw all of his energy, experience and executive ability into creating an efficient, smooth-functioning organization.

"The results he achieved have been commended time and again.

"Colonel Treest, above all, is a soldier. He insisted on military discipline, and he never tolerated inefficiency. He detested four-flushing and he recognized it when he saw it, for Colonel

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Treest never stopped delving into the technical aspects of the duties of his organization. He even made amateur radio his hobby, to improve his personal knowledge. In fact, at the outbreak of war he donated his own expensive radio apparatus to a signal company which needed equipment badly.

"Yet, being a stickler for discipline and efficiency didn't keep him from being *human*. A friendly interest in everyone he knew helped him to surround himself with competent men—he had a knack for fitting the right man in the right job. He never hesitated to encourage ideas or to do everything in his power to help develop those ideas. He put his stamp of approval on anything that spelled progress.

"While Colonel Treest demanded—and received—hard and efficient work, he went to any lengths to see that his people were treated right. He was always interested in their welfare, and he saw to it that the deserving received promotions, even if he had to release them to other organizations.

"This Ira Treest did, not because he was looking for something in return, but because it simply never occurred to him to do otherwise. One of his men summed it up this way: 'Colonel Treest is a square shooter.' It was incidental that such a personal interest engendered an amazing amount of loyalty and freely given extra effort in any organization he commanded.

"To say that Ira Treest is well-liked by his brother officers and his subordinates is an under-statement Our respect for his character and ability as an officer is matched only by the warm and genuine esteem we hold for him as a man and a friend.

"We of the Army Communications Service are going to miss him keenly, and we wish him all the rich and full pleasantries of life which have been so well earned by his long service to our nation."

V V

Sir John Dill Commends Quebec Communications

Commendation for the Signal Corps detachment which installed communications facilities at the Quebec conference has been expressed by Field Marshal Sir John Dill, British Chief of Staff, in a letter to Gen. George C. Marshall, U. S. Chief of Staff.

General Dill wrote: "I wonder if you would convey a word of thanks, on behalf of all of us, to those of the United States Signal Corps who were responsible for the excellent arrangements made for us at Quebec. Communications, on which everything depended, were quite first class and we appreciate very much indeed the considerable

effort which alone could have produced such efficient results."

The commendation has been forwarded by Maj. Gen. Harry C. Ingles, Chief Signal Officer, to Fort Monmouth, N. J., where the Signal Corps detachment is stationed and where it will be inserted in the service records of Lt. Albert C. Vales and the 20 men of the Eastern Signal Corps Unit Training Center who installed the system.

V V

Telephone Man Designs Electrical Gun Pointer

The telephone industry, through the Bell Telephone Laboratories, has played an important part in the development of the Army's new electrical gun pointer, which can spot enemy planes and blow them from the skies by shifting the switches of its electrical intellect. The device went on exhibition for the first time recently at the Summit, N. J., headquarters of the Bell laboratories.

The apparatus is known officially as the M9 electrical gun pointer. It is manufactured by the Western Electric Co. in Chicago and a number of subcontractors, including International Harvester, Liquid Carbonic, Teletype Corp., and the Union Special Machine Co.

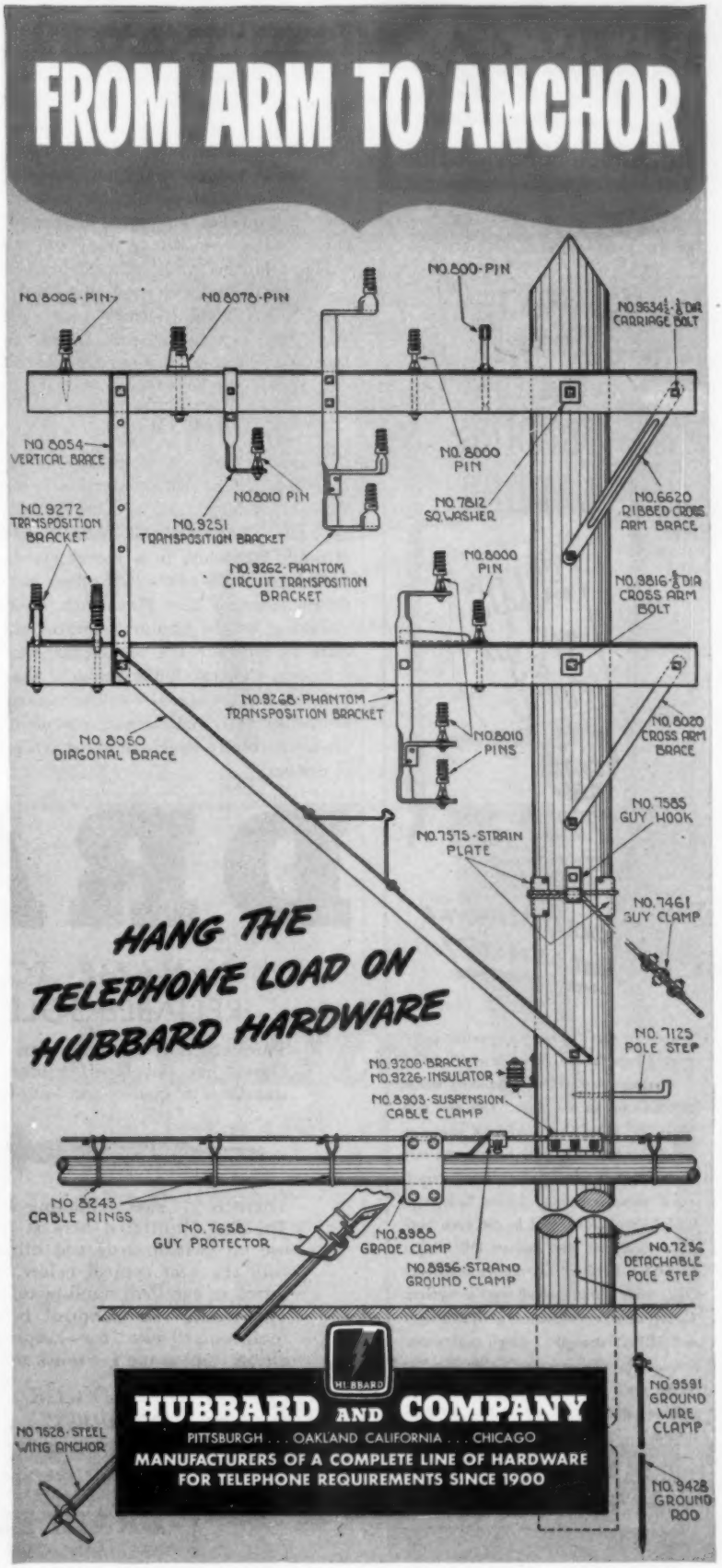
The use of electricity to solve the intricate problems of anti-aircraft gunnery was conceived by Dr. David B. Parkinson, Bell telephone expert. In a dream early in the war, Dr. Parkinson saw himself as a member of a Dutch anti-aircraft gun crew when the Low Countries were invaded. In the dream the gun control mechanism in the Dutch gun was an electrical device. His later investigations bore out the possibilities suggested in the dream.

In the recent demonstration, simulated enemy planes flew into sight. A gun crew, equipped with four 90 mm. anti-aircraft guns, spotted them with electrically-controlled range finders and trackers, the electrical computer instantly measured positions, and the guns concentrated simultaneous fire on the target.

Maj. Gen. Levin H. Campbell, chief of army ordnance, said the pointer is one of the reasons American gunners now are knocking down one enemy plane out of 90 shots. During the World War, Campbell said, the record was one plane hit out of 17,000 shots.

The electric pointer already has been used successfully by our troops on various battle fronts.

The first Signal Corps airplane was purchased from the Wright Brothers in August, 1908.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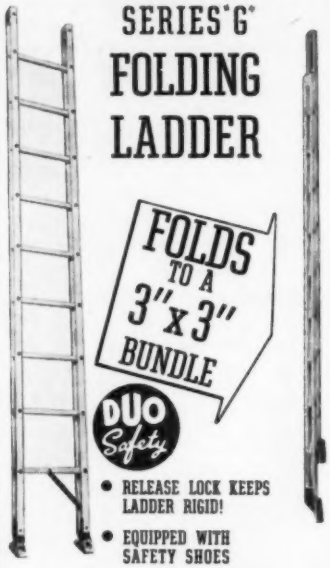

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Trencher Lights Up Board

At Camp Dodge, Iowa, during World War I, the camp telephone system was operated by the Bell company under Signal Corps supervision. The lines all entered the main office through about 200 feet of underground cable. One day a trenching machine, digging a sewer ditch, traveled unannounced in front of the telephone exchange and cut all cables completely. The switchboard lit up like a Christmas tree and the operators thought the Germans had them sure. Cable splicers were rushed in from Des Moines, and service was all restored by the next morning.

V V

Necessity for simplicity and flexibility in signal communications was stressed by Maj. Gen. Francis B. Wilby, superintendent of the United States Military Academy, in a recent speech before graduates of the 29th officer candidate school at Fort Monmouth, N. J. Speaking before the first four-month class to complete the course for commissions, General Wilby declared that unless adequate signal communications are consistently maintained, commanders are virtually unable to direct troops in combat.

MAJ. H. E. BILLINGTON who has been officer in charge of the Chicago Field Office, Philadelphia Signal Corps Procurement District, for the past year, has been transferred to the Air Corps, AAF Materiel Command, Wright Field, Dayton, Ohio. He will report there for duty shortly. Major Billington has had long experience in the independent telephone industry as an executive of the Kellogg Switchboard & Supply Co., resigning as executive vice president of that company in 1939.

In 1906, a Signal Corps balloon, making use of coal gas as a lifting agent, covered 104 miles.

DRAKE

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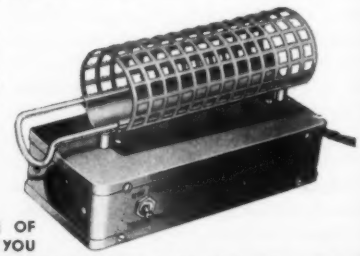
Through more than 25 years of soldering iron manufacturing, Drake has developed soldering products that set new high standards of quality and long-lived performance.

There is a Drake Soldering Iron just right for every purpose. The one illustrated here is the Drake No. 600-10—ideal for use on switchboards and other regular telephone work. Used with the heat control below, it forms an excellent stand-by unit. The Drake Heat Control is a foolproof device for keeping idling irons ready for quick use.



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DRAKE ELECTRIC WORKS, INC.
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Lip Microphone Used By Ground Forces

A midget microphone, worn on the upper lip, which eliminates outside noises and leaves the hands free, has been adopted for use by the Army Ground Forces and is now in production under the supervision of the Signal Corps, Army Service Forces.

Sustained in position by bands around the ears, the "lip mike" fits easily under gas masks and dust respirators and gives clear and intelligible reproduction with little distortion.

Lip microphone for use with radio and interphone equipment, showing microphone and headset plugged in associated jacks.

The microphone operates on a new noise-canceling principle, and intensive tests under the supervision of the Armored Command have demonstrated that the instrument is capable of superior performance in high noise levels.

Designed particularly for use in tanks and under conditions where free use of the hands is advantageous, the "lip mike" is more rugged than similar apparatus commonly found in broadcasting stations or in commercial telephones. It can withstand total immersion for about ten minutes without injury to its mechanism.

To increase clearness in reproduction the microphone is provided with breath shields in front and back, acting as buffers against puffs of air from the mouth which would otherwise cause confused or unintelligible sounds. Outside noises enter at both sides of the microphone's diaphragm in equal volume, and thus cancel themselves, while speech enters the opening nearest the mouth with much greater intensity than on the opposite sides. The frequency response is from 200 to 4,000 cycles at normal altitude.

The microphone is supported by

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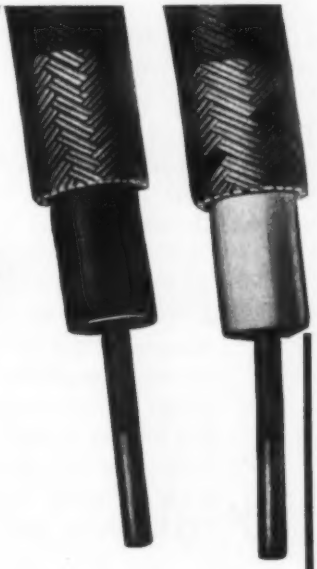

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1944 ★ ★ 49th YEAR!

TELEPHONY'S DIRECTORY

of the Telephone Industry

For 48 years this manual has been the telephone industry's official buyers' guide. The 1944, 49th annual edition, will be even more complete than ever.

What the 1944 Directory will contain:

(1) An accurate mailing list of the 7,000 Independent telephone companies operating over 12,000 exchanges in the U. S. A., U. S. Possessions, Canada, Central and South America; the name of the manager (or purchasing agent) of each company; size of each company, and the kind of equipment with which it is operating.

(2) A mailing list of all Independent Operating Groups, officers, and exchanges owned and operated.

(3) A list of the 6,500 Bell exchanges operating in the U. S.

(4) A Classified Products Index (bold face type listing for advertisers' products) classifying alphabetically all products and services used by telephone companies. This section is cross-referenced with

(5) A Manufacturers' Index which lists all firms (bold face type listing for advertisers) offering equipment, supplies or service for telephone companies.

(6) Personnel of the national and all state telephone associations, also of regulatory bodies having jurisdiction over telephone companies.

(7) A Statistical Section detailing accurately and comprehensively up-to-the-minute telephone statistics for each state and for the U. S. as a whole.

(8) A section entitled "Telephone Law and Commission Regulation" which presents a summary of current commission and court decisions that apply to the telephone business.

FROM the above it is obvious that TELEPHONY'S Directory is of value to operating companies and manufacturers alike. Telephone companies: Make certain that all branch exchange managers have a copy of TELEPHONY'S Directory. Send us a list of those people in your organization you would like to have receive a copy of the 1944 edition and we will advise you concerning bulk rates. Manufacturers: Most of your department heads and representatives will find a copy of TELEPHONY'S Directory useful every week during the year. Plan now to obtain as many extra copies as you will require. Write TELEPHONY, 608 S. Dearborn Street, Chicago, Illinois, about bulk rates.

***TELEPHONY'S Directory** is your logical choice for keeping in touch with the telephone field because you are certain to find a copy of it available for ready reference, 365 days of the year, in the office of practically every Independent and Bell telephone company in the U. S. A., U. S. Possessions, Canada and Central and South America.*

THE ONLY COMPLETE DIRECTORY OF THE TELEPHONE FIELD

metal, mounting brackets with two upstanding metal arms attached to loops of cord which fit over the user's ears. Both loops and bracket may be adjusted to bring the instrument directly opposite the lips of the wearer.

A midget combination—the lip microphone and the earphone headset recently adopted by the Signal Corps—now assures American soldiers of maximum protection and dependable performance.

V V

Washington Man Gets Merit Award

Award of the Legion of Merit to Master Sgt. Peter Ballyk, on duty in the Office of the Chief Signal Officer, has been announced by the War Department. The award was presented by Brig. Gen. Frank E. Stoner, Chief of the Army Communications Service, under whom Sergeant Ballyk has served at various times during his 16 years with the Signal Corps.

The citation reads, in part: "In a position of great responsibility, he constantly displayed energy, initiative, unfailing devotion to duty, and intelligent application of his training in the Signal Corps."

Sergeant Ballyk, a native of Everett, Wash., also received a citation for meritorious service in Hawaii in 1937.

V V

Signal Corps Switchboards Grown Up

Some of the old Signal Corps common battery telephone systems would prove a real curiosity in the present age. These systems usually consisted of a one-position, 100-line switchboard with a main frame on the end inclosed in a glass door cabinet.

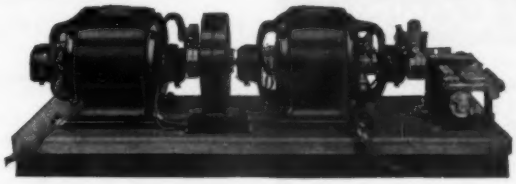
The line terminals on the main frame were cabled direct to the switchboard number and no means were provided for cross-connecting of lines for changes. The commanding officer was always No. 1 and the quarters or house numbers and telephone numbers were always the same. Many old-timers objected seriously in later years when this numbering arrangement was changed.

V V

Germans "Trap" Exchanges

It is reported that when the Germans retreat from a country, they leave the abandoned telephone exchanges filled with booby traps. This is surely a deadly practice, for the operation of any key or the setting-up of any connection might blow up the central office and kill all of its occupants.

RINGING and INTERRUPTER
Equipment for Telephone Exchanges



RINGING MOTOR GENERATOR SET

It is of vital importance that a telephone exchange operate dependably without interruption, AT ALL TIMES.

This is why Holtzer-Cabot ringing motor generators are designed and built to give a lifetime of continuous and dependable service.

Holtzer-Cabot ringing motor generator equipment has the unqualified approval of the engineering and service departments of all major telephone companies.

Our engineers will gladly confer with you. Their experience can be helpful—write for Bulletin 1310-02

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1. Form fitting back and deep, saddle seat upholstered in genuine leather over curled hair pads.
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3. Available in 4 seat height ranges: 18 to 22"; 21 to 25"; 24 to 28" and 28 to 32".
4. Solid maple frame with all joints glued and dowelled.
5. Wide choice of leathers and finishes.

Sold by Telephone Supply Houses
Manufactured by
STURGIS
POSTURE CHAIR COMPANY
Sturgis, Michigan

Signal Corps Rebuilds Cable

(Concluded from page 33)

new cable and equipment; Maj. John A. Wester, head of the Engineering Division under whose wing come the cableships and cable-laying operations; Capt. Wm. M. Thames, peacetime Southern Bell engineer, for a year officer in charge of one of the cableships; Lt. F. W. Kerr, peacetime power engineer, who has been in charge of numerous laying expeditions in which he used many improvised means such as barges, tugs, fishing boats, seaplane crash boats, scows, etc.; and Maj. Wm. V. Sayner, author of this article and peacetime employe of the American Telephone & Telegraph Co., who is in charge of all cableship engineering matters.

The Alaska Communication System is a part of the Army Communications Service whose director, Brig. Gen. Frank E. Stoner, was at one time executive of the system. The whole is under Maj. Gen. Harry C. Ingles, Chief Signal Officer of the Army, as part of the Army Service Forces.

V V

Corps Served Air Forces

Before the Army Air Forces were equipped with suitable wrecking equipment, the Signal Corps were frequently requested to furnish line construction trucks with pole derricks for handling damaged planes. No doubt the successful use of this arrangement influenced the present design of aircraft salvaging equipment.

V V

Dies In Jap Prison Camp

Death of First Lt. Paul F. Singer, Signal Corps, in a Japanese prison camp has been announced by the War Department. Lieutenant Singer, who had served in the Army for 15 years as an enlisted man and as an officer, was captured at Bataan. He is survived by a widow and son who were evacuated from the Philippines before the outbreak of the war and who now live at High Point, N. C.

V V

Rather Build Line Than Write

Lt. Col. Ora F. Roberts, when he sent in the story of the Alaska Military Highway Telephone Line (published on other pages of this issue) wrote: "I would rather build this line over again

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use SEYMOUR SMITH TOOLS...
TREE TRIMMERS
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A line of tools designed for linemen's use that are standard equipment with the world's largest Utility Companies.
Send for folder and prices of this labor saving equipment.
SEYMOUR SMITH & SON, Inc.
609 Main St., Oakville, Conn.

than to write an article about it." We do appreciate the fact that Colonel Roberts was able to take time out from his numerous other duties to tell about the completion of this most interesting telephone project.

V V

New "Walkie-Talkie" Radio Triples Old Model's Range

A new and improved model of the "Walkie-Talkie," the man-packed radio set used by front line troops for short and direct communications, is being supplied to troops at home and overseas, the War Department announced recently.

The new "Walkie-Talkie" has two outstanding improvements. Its range is triple that of the old model, and it has remarkable clarity of tone, the latter due to the use of frequency modulation, a system which permits staticless transmission and reception.

Other improvements include the following:

Instead of the old type super-regenerative receiver, the new "Walkie-Talkie" has an improved super-heterodyne. This facilitates "netting," or use of two or more sets on the same frequency for intercommunication.

Two antennas are provided instead of one. In addition to the standard vertical antenna, a goose-neck type is included. This permits the soldier using the set to operate it while he is prone on the ground or in a slit trench.

A headset is included with the new model, enabling the operator to "listen in" for a call, while a handset is available for use by the officer in command.

Miniature radio tubes are used, with a resultant increase in the life of batteries and in compactness.

Carrying qualities are improved through an extra strap that goes around the abdomen of the soldier, thus distributing the set's weight more evenly. The entire set is carried like a haversack.

The set is so treated that rain and immersion in water for short periods will not impair its operating efficiency.

With all the improvements, the weight of the set remains the same as that of the old model—about 35 pounds.

The "Walkie-Talkie" was developed by the Signal Corps of the Army in 1933. It is one of three "portable" radio sets designed, procured and maintained by the Signal Corps for combat troops, the others being the "Handie-Talkie," an integral hand-carried set with a shorter range than the "Walkie-Talkie," and the "Guidon" set, a two-piece radio that has a slightly longer range than the "Walkie-Talkie."

Former Telephone Man Executive at Camp Crowder

Lt. Col. Dee Berry, who has been serving as signal officer of the Northwest Service Command, has been appointed executive officer of the Central Signal Corps School at Camp Crowder, Mo., succeeding Capt. Bernard Ladon, who has been acting in that capacity and now becomes assistant executive officer.

After World War I, in which he saw service as a lieutenant in the aviation section of the Signal Corps, Colonel Berry went to work for the Southern Bell Telephone & Telegraph Co. at Atlanta, Ga., later becoming a general engineer for that organization.

As a reserve officer he was called to active duty in 1940 as assistant signal officer and later as executive officer of the Fourth Service Command, which post he held until his assignment to the Northwest Service Command.

V V

Signal Corps Purchases To Increase

Requirements of the Signal Corps for communications equipment in 1943 call for deliveries totaling approximately $3,250,000,000, or about two and one-half times the 1942 production, according to Brig. Gen. John H. Gardner, assistant chief of the Procurement and Distribution Service, Office of the Chief Signal Officer. For 1944, it is estimated that approximately $4,500,000,000 will be expended for radio, telephone, wire and other communications equipment, or about one-third more than in 1943.

"The coming months," says General Gardner, "will be strenuous for ourselves and our 5,000 contractors, but schedules must be met in spite of shortages of manpower, engineering ability and rapidly changing military requirements."

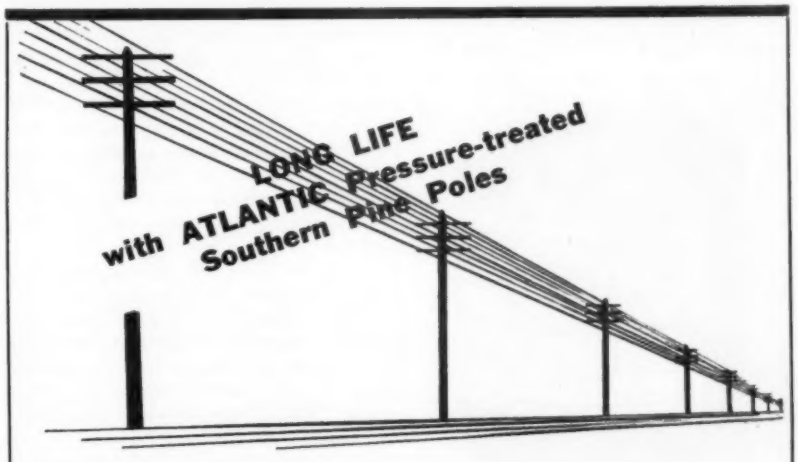
V V

Operator Saves Situation

In the early days at Fort Leavenworth, Kan., the light plant suddenly failed late one night and left the entire post including the station hospital in darkness. A surgeon grabbed the telephone and asked the night operator to arrange for emergency light immediately. The operator called the fire station and requested that they rush some oil lanterns to the hospital. Due to the quick thinking of this telephone operator, it was not necessary that a future general be ushered into this world in darkness.

V V

During the Civil War in 1863, the Signal Corps operated 30 field telegraph trains which sent messages over field lines as long as 20 miles.



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Push Buttons
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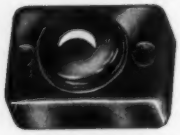

No. 10—beautifully finished black bakelite, new improved positive spring contacts. All metal parts rustproof and insulated. 1⅝" x 1⅛" x ⅞" high.

No. 11—with handsome metal escutcheon to hold name card. Same fine construction as No. 10 above.

Murdock also makes Precision Telephone Sets, Plugs and Radio Phones.

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Principles of Electricity Taught at Ft. Monmouth

"The Grand-daddy of Signal Schools," is the enlisted school at Fort Monmouth, N. J. The enlisted school has a many-sided instructional program for Signal Corps men, but the program is practically all based on one foundation —the common sub-course, "Principles of Electricity."

The necessity of this course as a preliminary to advanced training in radio, wire, and electronics is self-evident. The fact that the course is basic and necessary, however, does not mean that it is easy. Since the inception of the course many an enlisted student has found "Principles of Electricity" too high a hurdle to take in stride.

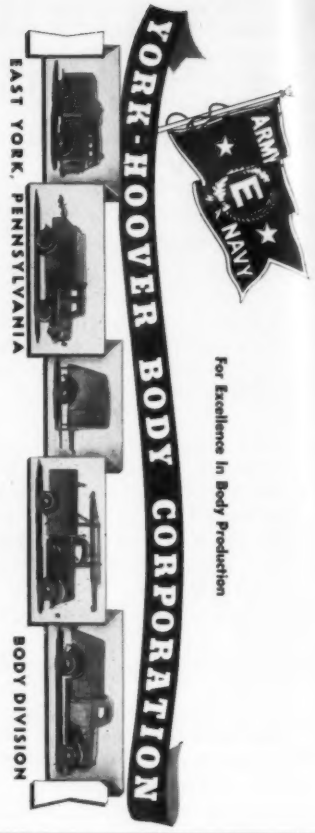
During the days of peace, when there was plenty of time for gradual assimilation of subject matter, successful completion of this course was not too hard a job. But wartime conditions are an entirely different story when time is an all-important factor, and the tempo of the training program has to be accelerated to meet the urgent demands of total war. Students have poured into the school from all walks of life and from a myriad of vocations.

A situation such as this could be mastered only by highly progressive methods of instruction. The wire division, enlisted school, Eastern Signal Corps Schools, met the challenge squarely. A completely new text was devised, incorporating the "Principles of Electricity" and simplifying the presentation of the subject matter. The self-study method was retained, but under more searching direction and supervision. Rapid students were allowed to progress at their own rate, provided only that they mastered the subject thoroughly.

Special classes were inaugurated for those students who lacked the prescribed educational requirements but showed aggressiveness and aptitude. Such students were placed in special groups, with one instructor for seven men. These groups used a large variety of visual aids, and were handled on the lecture-demonstration basis, plus prescribed home study. This scheme is making it possible for many men to acquire the fundamental knowledge of electricity, indispensable for more advanced work within the Signal Corps.

Many of the enlisted men assigned to the school were found deficient in arithmetic. Graphical devices were used to help such men overcome this handicap and achieve a better understanding of electricity. Complete laboratory demonstrations and training films were used to supplement visual aids of this type.

The training objective of the com-



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POTTING COMPOUNDS AND WAXES for wire, cable and junctions.

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WAXES AND COMPOUNDS for switchboards, coils, transformers, condensers, and all types of electronic devices.

Tell us your requirements

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Established 1846
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mon sub-course, "Principles of Electricity," is a thorough, practical working knowledge of the fundamentals of electricity. Today, the enlisted school is providing this knowledge not only to Signal Corps personnel but also to communications men from the other arms and services.

V V

Old Signal Corps Crew "Stepped On the Gas"

The late Col. S. C. Megill was a well known and colorful character in the Signal Corps. When the colonel, then a lieutenant, took a detachment of men into Mexico with Pershing, the single wire telegraph line furnished all communication. When this circuit went out day or night, the operator would yell, "Circuit open north" or south as the case might be and the Signal Corps crew and repair truck left camp like a fire engine.

The men could never get dressed and ready as fast as Lieutenant Megill and he would mount the truck, blow the horn and yell for them to hurry, several minutes before they were actually ready to start.

The sergeant arranged to have the operator call the crew before waking Lieutenant Megill. They got all dressed and in their places on the truck. When the operator yelled, "Line out south," they cranked the truck and left in a cloud of dust. It is doubtful if the lieutenant ever learned how he got left behind on that trip.

V V

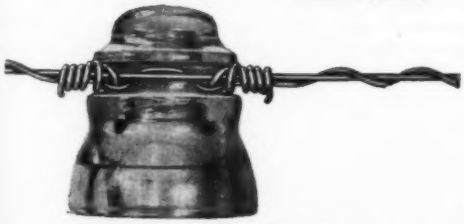
Colonel Watts Appointed Head of Holabird Depot

Col. Laurence Watts, Signal Corps, has been appointed commanding officer of the Holabird Signal Depot at Baltimore, which was formerly the Holabird Ordnance Depot and recently has been taken over by the Signal Corps. The new Signal Depot will store and issue air-borne and ground equipment, and has also taken over the activities of the Monmouth Signal Depot, which has been discontinued.

Colonel Watts is a graduate of the Sheffield Scientific School, 1909. After a year's study at the Massachusetts Institute of Technology he was commissioned second lieutenant in the Coast Artillery Corps in 1910. He served as a major with the AEF in France and in 1924 transferred to the Signal Corps. His most recent service has included assignments as Department Signal Officer, Panama Canal Department, and as commanding officer, Lexington (Ky.) Signal Depot.

DIAMOND TIE SPLINTS

PREFORMED



- Vibration Dampner.
- Prevents Contact with Insulator Reducing Abrasion.
- Grips Line Wire—Prevents Slipping.

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Ask for Bulletin T-153

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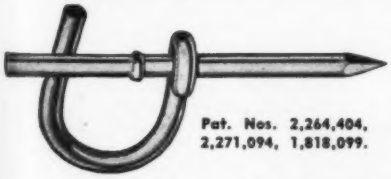

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Stronger — Direct Driving. Now made in 2-piece type only. Less danger of bending or closing eye.

Made in Three Size Eye Diameters —½"-⅝"-⅞".

Hot Dip Galvanized by New Process Prevents Flaking.

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PUBLIC ADDRESS SYSTEMS IN THE WAR

RECENT reports to the Signal Corps from fighting theaters abroad and military camps in this country attest that the loudspeaker is not only doing important combat duty with American troops but has become almost indispensable in training at home.

Long associated with sports events and other peacetime spectacles, the loudspeaker has emerged in many new roles since the war began and special public address equipment is now being

Carrying and pushing a boat through shallow rapids, these men and equipment on Guadalcanal were taken up the river for the purpose of broadcasting an order to the Japanese to surrender.

LT. COL. STUART F. CRAWFORD, Shelby, Ohio (left) and CAPT. JOHN A. BURDEN at mike on Guadalcanal in January of this year. Captain Burden was born in Tokyo, Japan, and his home is now in Maui, Hawaii. The broadcast is in English and Japanese, ordering Japanese soldiers, trapped in a pocket, to surrender. Two attempts were made within an hour's time, during which firing ceased, however no immediate surrender resulted.

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Once again we say Quick about Suttle remanufacturing service — service and satisfaction as usual.

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developed and procured by the Signal Corps and utilized in virtually every zone of operations.

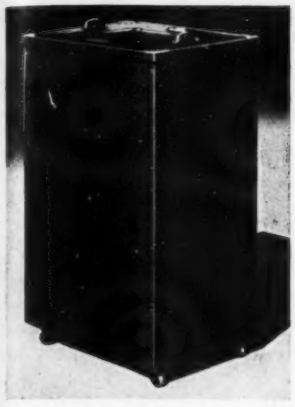
During the last days of organized enemy resistance on Guadalcanal, when the front lines were somewhat stabilized and the opposing troops were close to each other, an American officer who spoke Japanese used a loudspeaker to induce the enemy to surrender. One such broadcast brought in 20 Japanese with their hands up.

PVT. A. W. LANGILL, of Claremont, N. H., can be seen riding the gain on the amplifier on the public address and alert system of that battery, somewhere in Australia. This system, located in the first sergeant's office, is composed of a network set up in the battery into which is connected the necessary amount of loudspeakers to contact all persons in the immediate area of the battery. Current is supplied by local power and there is also an alternate six-volt power unit. This increases the efficiency of getting the battery alerted and contacting persons when needed. Radio musicals and news broadcasts are tuned in, and thereby everyone benefits.

In the recent landing operations which resulted in driving the Japanese from the island of Attu, loudspeakers were used in transmitting orders from shore to landing parties and they are being utilized for the same purpose in the present operations in the Mediterranean theater.

On all fronts the loudspeaker is employed on air fields in connection with air raid warnings when immediate dispersal of personnel and equipment is demanded, particularly when radio silence is imperative. On docks and piers or wherever substantial construction is under way, some form of public address equipment is usually in operation.

In the camps at home the loudspeaker has become a standard item of communications equipment. Beginning at reveille the public address system is busy a great part of the day with bugle calls and other military demands. It is employed by commanders and instructors in addressing large classes of troops and to aid in conducting exercises in the field and on the rifle ranges. Public address equipment also has proved of real value in the reproduction



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2508 SO. MICHIGAN AVE. CHICAGO, ILLINOIS

of battle sounds to accustom soldiers to the noises they will hear in actual combat.

In Signal Corps laboratories, public address apparatus frequently is employed to determine the efficiency of highly sensitive instruments and equipment by recreating the severe noise conditions of modern battle.

While standard commercial public address equipment is being used widely by the Army for general service, the Signal Corps is developing special types for military purposes besides procuring modified instruments through commercial channels.

It has been found that much equipment which gives satisfactory service under normal circumstances often cannot withstand extremes of heat and cold, the blasting of heavy guns and other adverse conditions on the fighting fronts.

V V

Electric Power Follows the Troops

The Signal Corps, Army Service Forces, makes use of as many as 60 different types of power units for ground use alone. All of those employed at present are powered by gasoline or diesel engines, which are used to drive the A.C. and/or D.C. generators.

For example, there is a little gadget weighing only 45 pounds, which a soldier can easily carry in a pack on his back. Its engine can run for eight hours on a single gallon of gasoline, operating a generator which provides 300 watts of 115-volt alternating current. This power unit is used to supply energy for a special telephone system —one which is capable of putting a half-dozen messages over a single pair of wires simultaneously.

Also classed as "portable" is another power unit, although it weighs 1,500 pounds. Its portability is achieved by means of a trailer. This unit, powerful enough to operate the largest radio transmitter used for tactical ground communications, produces 10,000 watts of 115-volt A.C., the same voltage as is supplied in ordinary house current. It is powered by a "jeep" engine. Still larger is another special purpose power unit; its output is 50,000 watts.

While each unit has its own particular use, some are designed for a multiplicity of purposes. For example, there is one unit which provides 1,000 watts at 115-volts, A.C. In addition to providing power for telephone equipment, lights and telegraph sets, this unit is also used to charge batteries. Manifestly, it would be inefficient to generate this current, then reduce it to lower voltage and change it to the direct current needed for battery charging. So the unit is so constructed that it generates 300 watts of 12-volt direct current, as well.

In between the extremes lie various other Signal Corps power units. All have two things in common: they can take the worst beating that weather can give them; they will not create radio interference.

As the present war is being fought by United States troops in all parts of the world, Signal Corps power units are tested to operate at temperatures ranging from 40 degrees below zero to 130 degrees above, Fahrenheit. Auxiliary starting aids, which apply heat to the crankcase, intake manifold, carburetor and battery, are used for starting the power units in cold climates. Self-starters are used on most of the larger units, some of which may be operated by remote control, while rope starters are provided for the smaller equipment. Similarly, water-cooling is

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DRIERITE dries the Cable Splice by positive absorption of all moisture from wires, insulation, bandage and surfaces inside the sleeve. Application is easy and rapid.

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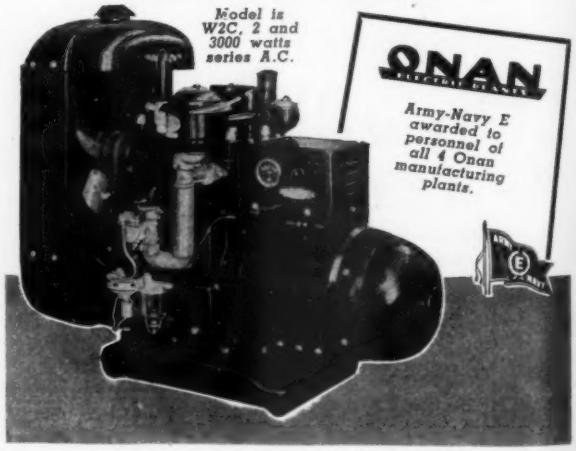

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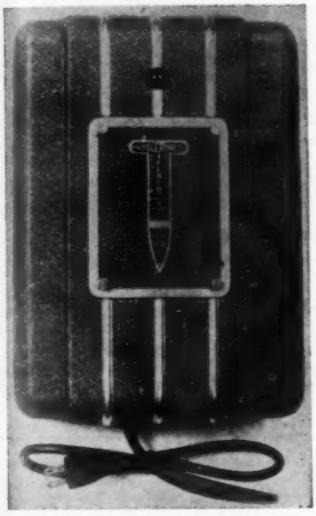
ECONOMY
RELIABILITY



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- Directly converts Commercial Alternating Current to Telephone Ringing Current.
- You can always depend upon our full co-operation and prompt service.

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provided on the majority of larger equipment, air-cooling on the smaller ones.

That each unit will meet the need for which it is designed is assured by careful engineering and rigid pre-production tests. When manufacture is commenced, the first production models are given extended tests which are even more severe. As production is continued, random samples are taken from the line and subjected to test to assure that they continue to meet Signal Corps performance specifications.

V V

Serves 32 Years as Temporary Employe

The chief operator of the telephone exchange at Ft. Santiago in the Philippines back in 1930 was an old Filipino named "Decario." This old boy was on the job when the Spanish were in Manila and he had just been transferred to the United States payroll. When he received a traffic complaint, Decario always used a stock answer, "Operator do not make mistake."

When he had completed about 32 years on the United States payroll, someone asked him when he intended to retire and he answered that he could not enjoy retirement because he was still a temporary employe. A Signal Corps soldier then remarked that Decario probably would not have taken the job in the first place had he known it was only temporary. This is explained by the fact that at that time, few Filipinos were hired under the United States Civil Service and so were just carried as temporary employes, regardless of their length of service.

The present whereabouts of Decario is not known but if he is still on the old job, we will wager that the Japs are getting some bad telephone service —and when they complain, he will innocently explain, "Operator do not make mistake."

V V

Lt. R. H. Grimes Is Made Captain

First Lt. Richard H. Grimes of Chicago, Signal Corps, has been promoted to the rank of captain at Daniel Field, the Army air base in Augusta, Ga., where he is base signal officer.

Captain Grimes was commissioned in May, 1942, after 19 years of continuous service with the Illinois Bell Telephone Co., in Chicago. In 1942 he attended the aircraft warning school, conducted by the Bell Telephone Laboratories in New York City, and then the chemical warfare service school at Edgewood Arsenal, Md., and the signal staff officers school at Orlando, Fla., before being assigned to Daniel Field.

Official USMC Photo

THE MARINES
HAVE THE SITUATION
and Bernard Pliers
WELL IN HAND

This is a typical picture of actual operations in the South Pacific. It illustrates the reason for the scarcity of linemen's pliers for civilian use.

Schollhorn production of the famous Bernard linemen's pliers as well as the line of Bernard parallel action hand tools has been greatly expanded. However military and war production needs have taken practically all of it.

Those fortunate enough to have these dependable tools are glad that they wear out so slowly and, in the case of Bernard parallel action pliers, nippers, etc., that jaws and cutters are easily replaceable.

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WANTED: Telephone Accountant—qualified to supervise all phases of telephone accounting for Class A companies. Give full information as to age, experience, draft status, etc. Attach small photograph. Write Telephone Services, Inc., 16th Floor, Lincoln Tower, Fort Wayne, Indiana.

COMMUNICATION WIRE CHIEF WANTED: The Tennessee Valley Authority has open a position for Communication Wire Chief at an annual entrance salary of $2300 based on a 40-hour week. This position now scheduled for a 48-hour week and carries a salary of $2798 per annum. An increase to the standard rate of $3163 (48-hour workweek) is given after a minimum of one year of satisfactory service.

The duties will involve testing, coordination of trouble, and maintenance of records on wire lines, wire terminals, wire carrier, and power line carrier communication equipment. Applicants should have high school education and several years' experience in testing and locating trouble on communication circuits by D.C. and A.C. electrical measurements.

Candidates interested in this or other communication positions should write requesting an application form. Persons now employed on other war work should not apply. Address all communications to the Personnel Department, Tennessee Valley Authority, Knoxville, Tennessee.

WANTED: Experienced lineman and trouble-shooter who can take care of an exchange of 400 telephones. Write Ray Jackson, Syracuse, Kansas.

SIGNAL CORPS MEN ATTENTION: When hostilities cease we will engage several salesmen to call on telephone companies and electrical jobbers throughout the Middle West States. If you are thoroughly familiar with telephone business requirements and have a basic knowledge of electrical apparatus, get yourself in line for one of these jobs. Send in your application which we will keep on file. Write Box No. 2029, c/o TELEPHONY.

WANTED: Central Office man familiar with maintaining and adjusting Strowger dial equipment. Opportunity for permanent position with Independent company in Pacific Northwest. Furnish outline of experience, qualifications, and draft status. Statement of availability required. Write Box No. 2026, care of TELEPHONY.

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WANTED: Combination man or general repairman for C.B. plant of approximately 600 stations, located in northern Louisiana. Must be capable. Permanent position. State age, experience and salary expected in first letter. Write Box 2028 c/o Telephony.

WANTED: An experienced, all-around telephone man for C. B. exchange, Stromberg-Carlson equipment, about 500 subscribers. Steady job. Price County Telephone Co., Phillips, Wis.

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Mr. General Manager: My 14 years of successful experience in the telephone business as an advertising, publicity, public relations and sales director gives the background and knowledge to do a JOB for you. The many post-war problems which will face the Telephone Industry will demand careful planning. I think I know how to help any telephone company develop and put into action, plans that will produce results and additional revenue. I am now employed. Just over draft age. Have a wide acquaintance throughout the middle-west. Write Box No. 2027, c/o Telephony.

WANTED

WANTED: By experienced and capable telephone man. To buy plant of around 500 stations, or sizeable interest in larger property and become manager of same. Write Mr. Roy E. Steele, 409 South St., Winchester, Ind.

FOR SALE

FOR SALE. One—Cook S-6-51 pair Cable terminal. Like new. Lightning arresters are true gap-discharge. Price $30.00. Write: N. N. Spillett, Mgr., The Brooklyn Mutual Telephone Co., Brooklyn, Iowa.

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BRAND NEW PLUGS — two conductor — for Magneto Switchboards. Prompt shipment.
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Heated Riding Boots Break Up Army Review

The commanding officer of an old-time cavalry post complained of cold feet during reviews of the regiment, so requested a Signal Corps master sergeant to provide electric heaters for his riding boots. This was before the heated flying suits had been perfected, and while the sergeant was a good communication specialist, he knew very little about the proper control of electric heat. He was, however, a good soldier and an order from his commanding officer meant only one thing to him—*action*.

Heaters, therefore, were provided for the colonel's boots which seemed to work satisfactorily on test. On Saturday morning, the review was in progress and the commanding officer had a feeling of well being, also warm feet. All was not well, however, for the boots got hot and hotter and finally they sizzled. The colonel got a double hot-foot and the horse suffered the reflected heat and started prancing in a manner which did not add to the dignity of the review. Finally, the poor horse could not stand it any longer. It broke and ran, with the staff in hot pursuit, much to the amusement of the troopers.

The master sergeant could never live down this incident on that post; he finally requested foreign service and was sent to the Philippines.

DISCIPLINE WINS A WAR

"In the hands of junior officers lies the fate of an Army. You are in direct, immediate command of the troops. You are their inspiration and leaders. All of you are fighting for the right to live as you please as long as you don't get unjustly in other people's hair. You are fighting against dictation and dictators. Only discipline will win a war. Victories come from discipline. And discipline comes from the everlasting efforts of the junior officers."

—Gen. Dwight D. Eisenhower.

V V

A Cable Engineer Doubts a Skipper

In the old days, the Signal Corps maintained a rubber insulated submarine cable between Manila and Corregidor in the Philippines. The mine planter of the coast artillery, a ship equipped for cable work was used for making repairs of this cable when it developed trouble. One night at dark, a storm came up and it was necessary to throw the cable overboard and the old Irish skipper marked it with a buoy.

The cable engineer jokingly remarked that he hoped they would be able to locate it the next morning. Well, just at sunup the following day, the engineer came on the bridge, the skipper took him by the arm and pointed dead ahead to the buoy riding on the waves and inquired, "What do you think of that?" The engineer replied he considered it good guessing which caused the old skipper to remark, "Guess Hell, that's navigation."

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TOTAL WEIGHT		7 lbs.

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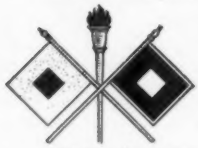

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